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AXIALLY SYMMETRIC AND ANNULAR SUPERSONIC NOZZLE PROFILES

By
W. L. CHOW

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by

W. L. Chow

Department of Mechanical and Industrial Engineering
Engineering Experiment Station
University of Illinois
Urbana, Illinois

427L003

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Axially Symmetric and Annular Supersonic Nozzle Profiles

Introduction

Along with the rapid developments on the high speed aircrafts and missiles, considerable progress has been made in the development of high speed electronic computing facilities. The latter has been achieved to such an extent that the numerical calculations of a great many engineering problems which would be unreasonably time-consuming and laborious many year ago, can now be handled by high speed computers as a mattwr of routine. The adaptation of the computing devices to the study of compressible fluid flow problems is of natural consequence, and in particular to the numerical calculation of the supersonic flow fields on the basis of the Method of Characteristics.

Of special interest is the calculation of supersonic nozzles (bell nozzles) which generate supersonic parallel outflows mainly for wind tunnel testing purposes. Also the present trend on the development of nozzles for rocket propulsion has indicated favorable considerations on the truncated bell nozzles.

Also of specific interest is the design of annular supersonic nozzles. The main interest on this type of nozzles lies in providing the wind tunnel tests and studies of the propulsive-nozzle-aterbody performances at the simulated flight conditions without any interferences from the front-body or supporting struts.

The present report is a compilation of both series of nozzle profiles calculated on the basis of the Method of Characteristics. For all the nozzles calculated, the solid wall shape in the expansion region downstream of the throat

has been selected to be parabolic, with the ratio of the radius of curvature at the throat and the radius of the nozzle at the throat to be ten. While axially symmetric nozzles were calculated for eight design Mach Numbers (M_d = 1.5, 1.75, 2.00, 2.25, 2.5, 3.0, 4.0, 5.0), the annular nozzles were calculated for five design Mach Numbers (M_d = 1.5, 1.75, 2.00, 2.25, 2.5), with five values of the cylindrical-sting-to-throat-radius ratio $\left(\frac{R_s}{R_o}\right.$ = 0.5, 0.4, 0.3, 0.25, 0.2).

Description of the calculations

Referring to Fig. 1, where both types of nozzle profiles in the meriden planes are presented, the flow fields of these nozzles may be divided into the expansion region and the wave cancellation region, which are divided by a characteristics ending on the axis (or on the sting surface) where the fluid has the design Mach Number, M_d.

The shape of the wall downstream of the throat in the expansion region has been selected to be parabolic, i. e.

$$\frac{R}{R_o} = 1 + \frac{1}{20}\left(\frac{x}{R_o}\right)^2$$

which will give a ratio of ten between the radius of curvature at the throat and the radius of the throat, namely,

$$\frac{R_c}{R_o} = 10$$

where

$$R_c = \frac{1}{\left(\frac{d^2R}{dx^2}\right)_{x=0}}$$

In the light of the studies made by Oswatitisch (Ref. 1), Sauer (Ref. 2) and Lord (Ref. 3) on the flow through axially symmetric and annular nozzles near the throat region, here it is assumed for the nozzles with the selected parabolic wall shape, that

1) the flow is uniform at the throat,

2) this uniform flow of fluid at the throat has a Mach Number of 1.01 in order to start the calculations.

Thus the calculations may be carried out for the expansion region until the state of the fluid on the axis (or on the sting surface) reached the desired design Mach Number (identified as point A in Fig. 1). The wall shape in the wave-cancellation region

is established step-by-step by iterations such that the fluid has the uniform flow condition at the desired Mach Number downstream of the characteristics emanating from the point A on the axis (or on the sting surface).

It is understood that in the practical design of these types of nozzles for wind tunnel testing one would have to apply the boundary layer correction to these nozzle profiles. Such corrections may be estimated with the methods, e.g. developed by Culick and Hill (Ref. 4) or by Elliott, Bartz and Silver (Ref. 5).

Description of the Results

The results of calculation presented here in table form are reproduced directly from the output of the Illiac*. The information pertaining to the expansion region is obtained by alternatively printing the axis point (or the string surface point) and then the profile point until the selected design Mach Numbe r is reached on the axis (or on the sting). The nozzle profile in the wave cancellation region is then printed up to the exit section of the nozzle.

As one may check from the presented results that for all nozzles thus calculated, the area ratios are all within two-tenth of one per cent deviation from the corresponding values given by the one dimensional flow relationship pertaining to the respective design Mach Numbers.

Calibration tests of the Nozzles

An axially symmetric nozzle of $M_d = 2$ was built at the University of Illinois according to the calculated profile for the supersonic flow region (without boundary layer correction) and an elliptic profile (major to minor axis ratio of 5/3) for the wall shape upstream of the throat. The calibration test (with 80 psia

*Electronic Digital Computer, Engineering Research Laboratory, University of Illinois.

stagnation pressure) showed that the nozzle produced a uniform supersonic flow of $M_e = 1.97$. Fig. 2a is the schlieren photograph obtained from this test. Another calibration test (with ~ 40 psia stagnation pressure) on an annular nozzle which was designed for $M_d = 2$ and Rs/Ro = 1/2 according to the calculated profile, showed again that the flow is of reasonable uniformity at the exit section with $M_e = 1.96$. The schlieren picture for this nozzle flow is shown in Fig. 2b.

Acknowledgement

The author wishes to thank Mr. D. E. Wollersheim for his help in the testing of the nozzles and the preparation of this report.

References

(1) Oswatitsch, K., and Rothstein, W., "Flow Pattern in a Converging - Diverging Nozzle", NACA TM No. 1215 (1949)

(2) Sauer, R., 'General Characteristics of the Flow Through Nozzles at Near Critical Speeds". NACA TM No. 1147 (1947)

(3) Lord, W.T., "A Theoretical Study of Annular Supersonic Nozzles". Report No. Aero 2627. RAE. (Oct. 1959).

(4) Culick, F.E.C. and Hill, J.A.F., "A Turbulent Analog of the Stewartson - Illingworth Transformation". JAS, Vol. 25, No. 4, pp. 259-262, April, 1958.

(5) Elliott, D.G., Bartz, D.R. and Silver, S. "Calculation of Turbulent Boundary-Layer Growth and Heat Transfer in Axi-Symmetric Nozzles", Tech. Rept. No. 32-387, Jet Propulsion Laboratory, California Institute of Technology (February, 1963).

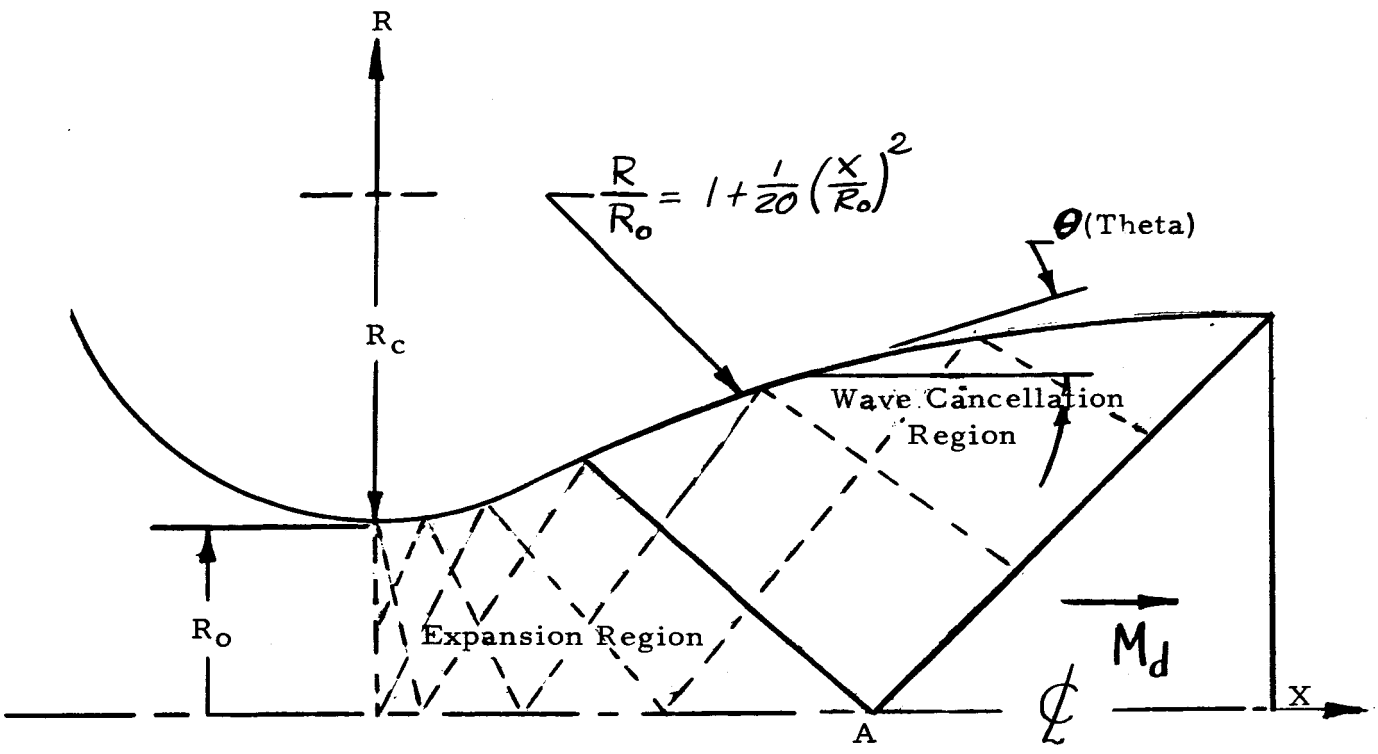

Fig. 1a Flow Field within Axially Symmetric Nozzles

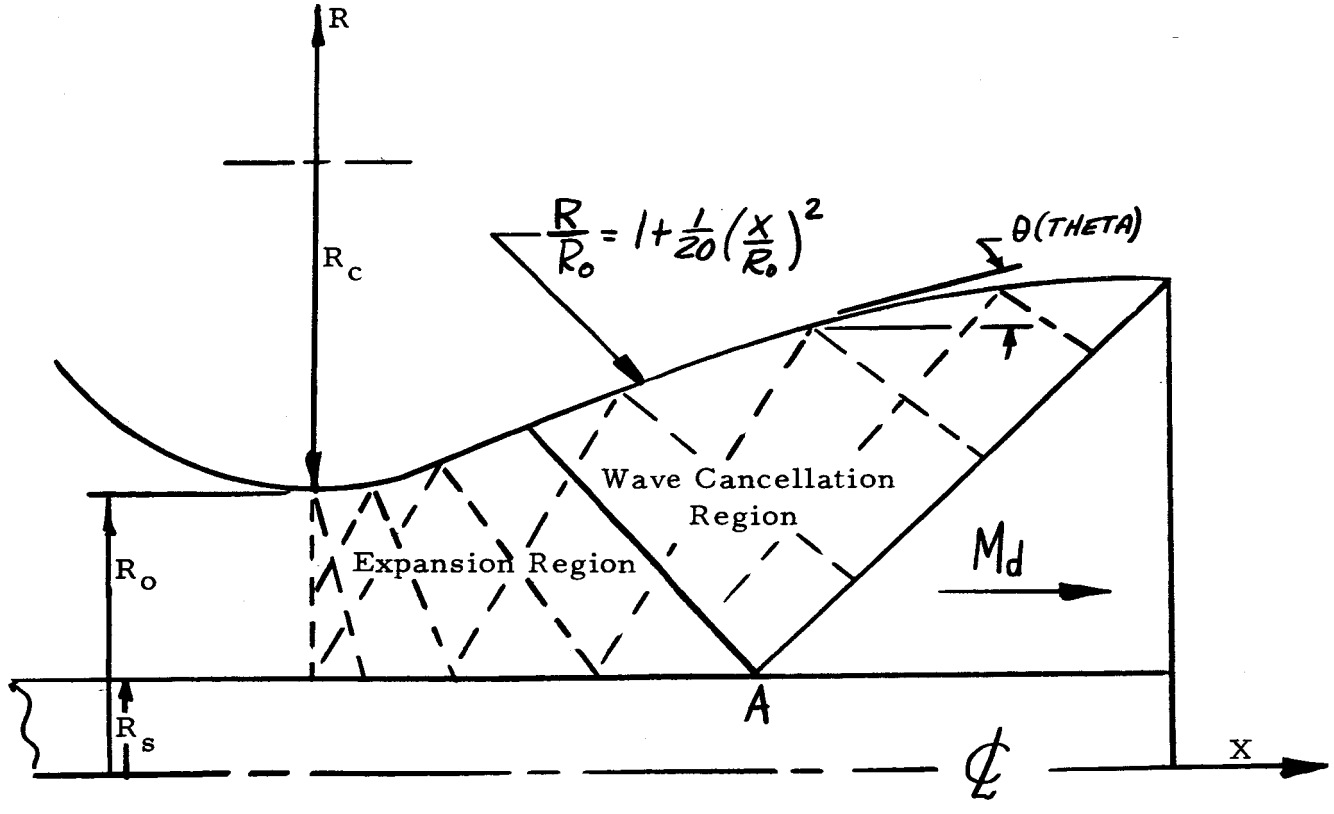

Fig. 1b Flow Field within Annular Nozzles

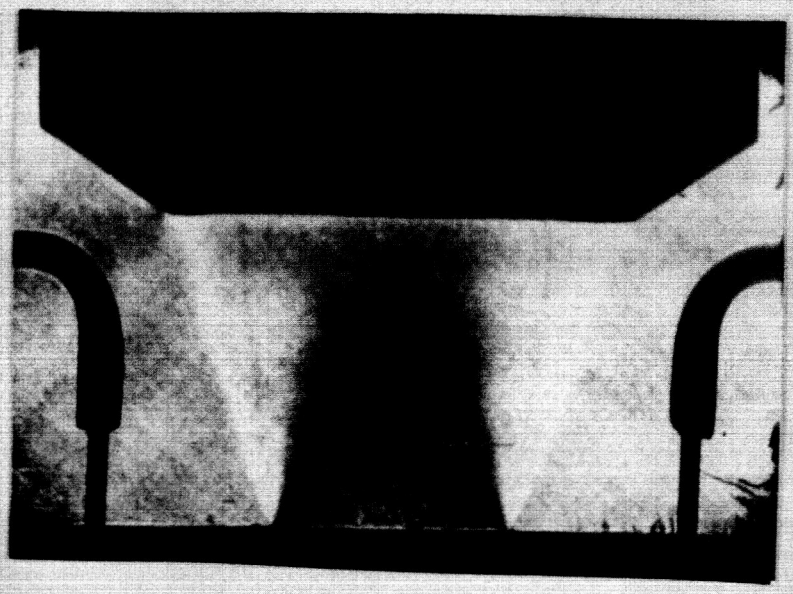

Fig. 2a Schlieren Photograph for Axially Symmetric Nozzle Test ($M_d = 2$)

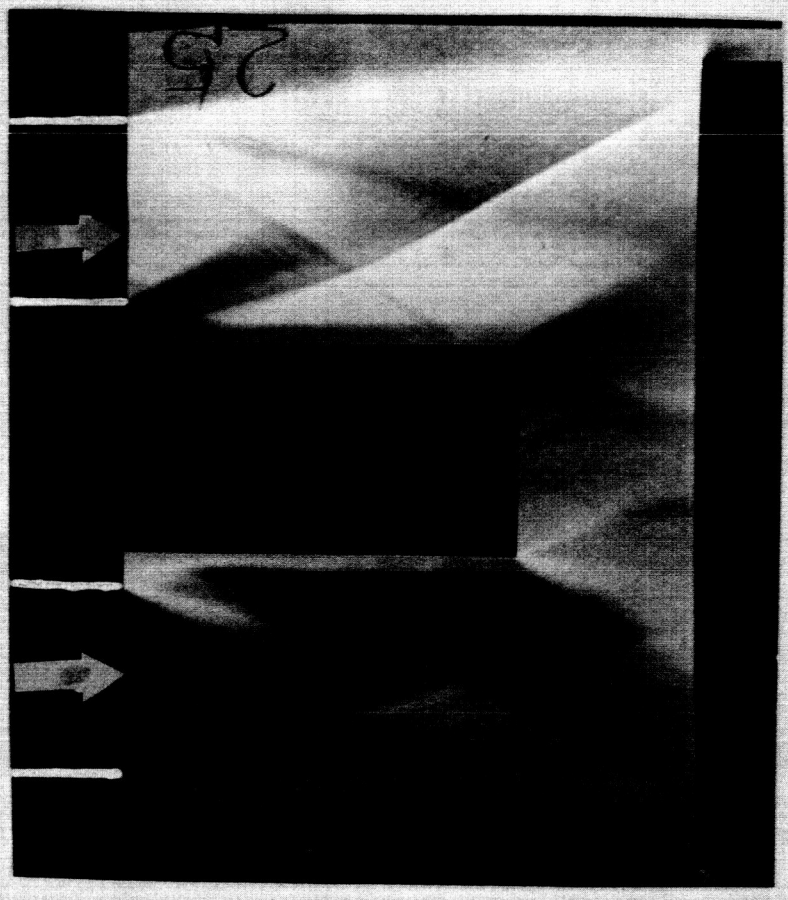

Fig. 2b Schlieren Photograph for Annular Nozzle Test ($M_d = 2$, $R_s/R_o = 1/2$)

PART I AXIALLY SYMMETRIC NOZZLE PROFILE

TABLE 1

DESIGN MACH NUMBER= 1.5, RO = 0.1

X	R	M STAR	M	P/PO	THETA
+.028203	+.000000	1.04800	1.05845	.492816	+.000
+.002036	+.100002	1.01983	1.02394	.513616	+.117
+.037836	+.000000	1.07743	1.09519	.471151	+.000
+.004388	+.100010	1.03032	1.03673	.505862	+.251
+.046305	+.000000	1.10145	1.12571	.453557	+.000
+.006962	+.100024	1.04042	1.04911	.498404	+.399
+.054259	+.000000	1.12397	1.15479	.437154	+.000
+.009713	+.100047	1.05037	1.06139	.491065	+.557
+.061958	+.000000	1.14528	1.18274	.421730	+.000
+.012621	+.100080	1.06029	1.07371	.483755	+.723
+.069538	+.000000	1.16590	1.21020	.406916	+.000
+.015674	+.100123	1.07026	1.08618	.476418	+.898
+.077090	+.000000	1.18609	1.23750	.392529	+.000
+.018863	+.100178	1.08035	1.09888	.469005	+1.081
+.084678	+.000000	1.20605	1.26491	.378435	+.000
+.022187	+.100246	1.09061	1.11188	.461484	+1.271
+.092356	+.000000	1.22594	1.29268	.364522	+.000
+.025647	+.100329	1.10109	1.12525	.453819	+1.469
+.100173	+.000000	1.24594	1.32104	.350692	+.000
+.029246	+.100428	1.11184	1.13907	.445976	+1.675
+.108177	+.000000	1.26614	1.35018	.336886	+.000
+.032993	+.100544	1.12292	1.15342	.437918	+1.890
+.116426	+.000000	1.28670	1.38038	.323015	+.000
+.036900	+.100681	1.13439	1.16840	.429598	+2.113
+.124986	+.000000	1.30783	1.41199	.308972	+.000
+.040987	+.100840	1.14635	1.18415	.420959	+2.347
+.133952	+.000000	1.32972	1.44537	.294664	+.000

X	R	M STAR	M	P/PO	THETA
+.045285	+.101025	1.15892	1.20085	.411918	+2.593
+.143459	+.000000	1.35271	1.48120	.279905	+.000
+.049844	+.101242	1.17229	1.21879	.402353	+2.854
+.148329	+.000000	1.36460	1.50004	.272387	+.000
+.052168	+.101361	1.17918	1.22810	.397441	+2.986
+.069988	+.102335	1.21159	1.27260	.374544	+3.271
+.086579	+.103278	1.23447	1.30472	.358603	+3.239
+.105263	+.104302	1.25686	1.33674	.343204	+3.033
+.120463	+.105075	1.27302	1.36022	.332225	+2.792
+.134131	+.105712	1.28629	1.37977	.323291	+2.539
+.146908	+.106249	1.29772	1.39679	.315665	+2.281
+.159140	+.106709	1.30785	1.41201	.308963	+2.022
+.171030	+.107102	1.31696	1.42583	.302975	+1.764
+.182712	+.107436	1.32524	1.43849	.297571	+1.510
+.194280	+.107715	1.33280	1.45013	.292669	+1.260
+.205802	+.107944	1.33970	1.46082	.288223	+1.017
+.217330	+.108125	1.34596	1.47059	.284210	+.783
+.228906	+.108261	1.35158	1.47941	.280626	+.562
+.240553	+.108355	1.35650	1.48718	.277499	+.358
+.252270	+.108410	1.36062	1.49371	.274895	+.180
+.263975	+.108433	1.36370	1.49860	.272957	+.044
+.269568	+.108435	1.36460	1.50004	.272388	+.000

TABLE 2

DESIGN MACH NUMBER= 1.75, RO = 0.1

X	R	M STAR	M	P/PO	THETA
+.028203	+.000000	1.04800	1.05845	.492816	+.000
+.002036	+.100002	1.01983	1.02394	.513516	+.117
+.037836	+.000000	1.07743	1.09519	.471151	+.000
+.004388	+.100010	1.03032	1.03673	.505862	+.251
+.046305	+.000000	1.10145	1.12571	.453557	+.000
+.006962	+.100024	1.04042	1.04911	.498404	+.399
+.054259	+.000000	1.12397	1.15479	.437154	+.000
+.009713	+.100047	1.05037	1.06139	.491065	+.557
+.061958	+.000000	1.14528	1.18274	.421730	+.000
+.012621	+.100080	1.06029	1.07371	.483755	+.723
+.069538	+.000000	1.16590	1.21020	.406916	+.000
+.015674	+.100123	1.07026	1.08618	.476418	+.898
+.077090	+.000000	1.18609	1.23750	.392529	+.000
+.018863	+.100178	1.08035	1.09888	.469005	+1.081
+.084678	+.000000	1.20605	1.26491	.378435	+.000
+.022187	+.100246	1.09061	1.11188	.461484	+1.271
+.092356	+.000000	1.22594	1.29268	.364522	+.000
+.025647	+.100329	1.10109	1.12525	.453819	+1.469
+.100173	+.000000	1.24594	1.32104	.350692	+.000
+.029246	+.100428	1.11184	1.13907	.445976	+1.675
+.108177	+.000000	1.26614	1.35018	.336886	+.000
+.032993	+.100544	1.12292	1.15342	.437918	+1.890
+.116426	+.000000	1.28670	1.38038	.323015	+.000
+.036900	+.100681	1.13439	1.16840	.429598	+2.113
+.124986	+.000000	1.30783	1.41199	.308972	+.000

X	R	M STAR	M	P/PO	THETA
+.040987	+.100840	1.14635	1.18415	.420959	+2.593
+.133952	+.000000	1.32972	1.44537	.294664	+.000
+.045285	+.101025	1.15892	1.20085	.411918	+2.593
+.143459	+.000000	1.35271	1.48120	.279805	+.000
+.049844	+.101242	1.17229	1.21879	.402353	+2.854
+.153731	+.000000	1.37733	1.52045	.264432	+.000
+.054752	+.101499	1.18676	1.23842	.392051	+3.134
+.186487	+.000000	1.45166	1.64522	.219961	+.000
+.070226	+.102466	1.23244	1.30185	.360007	+4.017
+.213286	+.000000	1.50971	1.75010	.187795	+.000
+.082574	+.103409	1.26854	1.35369	.335254	+4.720
+.107171	+.105504	1.31329	1.42024	.305384	+5.013
+.123357	+.106911	1.33635	1.45563	.290375	+4.928
+.138005	+.108152	1.35485	1.48457	.278546	+4.757
+.151778	+.109272	1.37068	1.50975	.268577	+4.544
+.165041	+.110298	1.38473	1.53245	.259848	+4.303
++178017	+.111245	1.39750	1.55336	.252019	+4.043
+.190854	+.112122	1.40928	1.57289	.244884	+3.769
+.203669	+.112934	1.42028	1.59135	.238303	+3.483
+.216554	+.113685	1.43063	1.60892	.232180	+3.188
+.229595	+.114376	1.44044	1.62574	.226446	+2.884
+.242882	+.115009	1.44977	1.64192	.221048	+2.572
+.256515	+.115584	1.45868	1.65754	.215943	+2.254
+.270617	+.116099	1.46724	1.67267	.211098	+1.929
+.285364	+.116553	1.475474	1.68738	.206484	+1.598
+.301040	+.116944	1.48343	1.70173	.202065	+1.260
+.348285	+.117625	1.50209	1.73593	.191080	+.392
+.382391	+.117742	1.50970	1.75008	.187802	+.000

TABLE 3

DESIGN MACH NUMBER= 2.0, RO = 0.1

X	R	M STAR	M	P/PO	THETA
+.028203	+.000000	1.04800	1.05845	.492816	+.000
+.002036	+.100002	1.01983	1.02394	.513616	+.117
+.037836	+.000000	1.07743	1.09519	.471151	+.000
+.004388	+.100010	1.03032	1.03673	.505862	+.251
+.046305	+.000000	1.10145	1.12571	.453557	+.000
+.006962	+.100024	1.04042	1.04911	.498404	+.399
+.054259	+.000000	1.12397	1.15479	.437154	+.000
+.009713	+.100047	1.05037	1.06139	.491065	+.557
+.061958	+.000000	1.14528	1.18274	.421730	+.000
+.012621	+.100080	1.06029	1.07371	.483755	+.723
+.069538	+.000000	1.16590	1.21020	.406916	+.000
+.015674	+.100123	1.07026	1.08618	.476418	+.898
+.077090	+.000000	1.18609	1.23750	.392529	+.000
+.018863	+.100178	1.08035	1.09888	.469005	+1.081
+.084678	+.000000	1.20605	1.26491	.378435	+.000
+.022187	+.100246	1.09061	1.11188	.461484	+1.271
+.092356	+.000000	1.22594	1.29268	.364522	+.000
+.025647	+.100329	1.10109	1.12525	.453819	+1.469
+.100173	+.000000	1.24594	1.32104	.350692	+.000
+.029246	+.100428	1.11184	1.13907	.445976	+1.675
+.108177	+.000000	1.26614	1.35018	.336886	+.000
+.032993	+.100544	1.12292	1.15342	.437918	+1.890
+.116426	+.000000	1.28670	1.38038	.323015	+.000

X	R	M STAR	M	P/PO	THETA
+.036900	+.100681	1.13439	1.16840	.429598	+2.113
+.124986	+.000000	1.30783	1.41199	.308972	+.000
+.040987	+.100840	1.14635	1.18415	.420959	+2.347
+.133952	+.000000	1.32972	1.44507	.294664	+.000
+.045285	+.101025	1.15892	1.20085	.411918	+2.593
+.143459	+.000000	1.35271	1.48120	.279905	+.000
+.049844	+.101242	1.17229	1.21879	.402353	+2.854
+.153731	+.000000	1.37733	1.52045	.264432	+.000
+.054752	+.101499	1.18676	1.23842	.392051	+3.134
+.186487	+.000000	1.45166	1.64522	.219961	+.000
+.070226	+.102466	1.23244	1.30185	.360007	+4.017
+.224067	+.000000	1.53120	1.79080	.176504	+.000
+.087481	+.103826	1.28252	1.37419	.325821	+5.000
+.270259	+.000000	1.62029	1.97225	.133438	+.000
+.107509	+.105779	1.34009	1.46143	.287972	+6.136
+.277135	+.000000	1.63300	2.00002	.127801	+.000
+.110364	+.106090	1.34824	1.47417	.282752	+6.298
+.139465	+.109379	1.40033	1.55802	.250301	+6.598
+.153892	+.111037	1.42075	1.59214	.238023	+6.515
+.167850	+.112612	1.43859	1.62255	.227523	+6.363
+.181563	+.114117	1.45462	1.65041	.218261	+6.163
+.195187	+.115560	1.46936	1.67645	.209905	+5.930
+.208844	+.116947	1.48309	1.70113	.202250	+5.669
+.222636	+.118282	1.49604	1.72476	.195154	+5.385
+.236662	+.119567	1.50836	1.74758	.188515	+5.081
+.251025	+.120803	1.52018	1.76980	.182251	+4.758
+.265847	+.121992	1.53160	1.79158	.176295	+4.417
+.281282	+.123136	1.54273	1.81309	.170588	+4.056
+.297550	+.124235	1.55366	1.83455	.165067	+3.674
+.315016	+.125294	1.56457	1.85625	.159652	+3.265
+.369287	+.127818	1.59320	1.91474	.145878	+2.060

X	R	M STAR	M	P/PO	THETA
+.428730	+.129361	1.61654	1.96417	.135123	+.915
+.493865	+.129913	1.63208	1.99800	.128203	+.055
+.502159	+.129917	1.63300	2.00002	.127802	+.000

TABLE 4

DESIGN MACH NUMBER= 2.25, RO = 0.1

X	R	M STAR	M	P/PO	THETA
+.028203	+.000000	1.04800	1.05845	.492816	+.000
+.002036	+.100002	1.01983	1.02394	.513616	+.117
+.037836	+.000000	1.07743	1.09519	.471151	+.000
+.004388	+.100010	1.03032	1.03673	.505862	+.251
+.046305	+.000000	1.10145	1.12571	.453557	+.000
+.006962	+.100024	1.04042	1.04911	.498404	+.399
+.054259	+.000000	1.12397	1.15479	.437154	+.000
+.009713	+.100047	1.05037	1.06139	.491065	+.557
+.061958	+.000000	1.14528	1.18274	.421730	+.000
+.012621	+.100080	1.06029	1.07371	.483755	+.723
+.069538	+.000000	1.16590	1.21020	.406916	+.000
+.015674	+.100123	1.07026	1.08618	.476418	+.898
+.077090	+.000000	1.18609	1.23750	.392529	+.000
+.018863	+.100178	1.08035	1.09888	.469005	+1.081
+.084678	+.000000	1.20605	1.26491	.378435	+.000
+.022187	+.100246	1.09061	1.11188	.461484	+1.271
+.092356	+.000000	1.22594	1.29268	.364522	+.000
+.025647	+.100329	1.10109	1.12525	.453819	+1.469
+.100173	+.000000	1.24594	1.32104	.350692	+.000
+.029246	+.100428	1.11184	1.13907	.445976	+1.675
+.108177	+.000000	1.26614	1.35018	.336886	+.000
+.032993	+.100544	1.12292	1.15342	.437918	+1.890
+.116426	+.000000	1.28670	1.38038	.323015	+.000
+.036900	+.100681	1.13439	1.16840	.429598	+2.113

X	R	M STAR	M	P/PO	THETA
+.124986	+.000000	1.30783	1.41199	.308972	+.000
+.040987	+.100840	1.14635	1.18415	.420959	+2.347
+.133952	+.000000	1.32972	1.44537	.294664	+.000
+.045285	+.101025	1.15892	1.20085	.411918	+2.593
+.143459	+.000000	1.35271	1.48120	.279905	+.000
+.049844	+.101242	1.17229	1.21879	.402353	+2.854
+.153731	+.000000	1.37733	1.52045	.264432	+.000
+.054752	+.101499	1.18676	1.23842	.392051	+3.134
+.186487	+.000000	1.45166	1.64522	.219961	+.000
+.070226	+.102466	1.23244	1.30185	.360007	+4.017
+.224067	+.000000	1.53120	1.79080	.176504	+.000
+.087481	+.103826	1.28252	1.37419	.325821	+5.000
+.270259	+.000000	1.62029	1.97225	.133438	+.000
+.107509	+.105779	1.34009	1.46143	.287972	+6.136
+.311702	+.000000	1.69117	2.13408	.103681	+.000
+.124318	+.107727	1.38715	1.53639	.258357	+7.087
+.341471	+.000000	1.73740	2.24996	.086488	+.000
+.135659	+.109202	1.41831	1.58803	.239476	+7.726
+.154712	+.111839	1.45427	1.64979	.218462	+8.039
+.169158	+.113881	1.47644	1.68912	.205942	+8.047
+.183412	+.115885	1.49592	1.72453	.195222	+7.960
+.197628	+.117854	1.51354	1.75728	.185758	+7.808
+.211930	+.119789	1.52983	1.78817	.177214	+7.607
+.226424	+.121694	1.54510	1.81772	.169384	+7.369
+.241215	+.123572	1.55957	1.84627	.162123	+7.097
+.256418	+.125424	1.57344	1.87412	.155319	+6.797
+.272164	+.127255	1.58684	1.90154	.148884	+6.468
+.288629	+.129069	1.59991	1.92879	.142740	+6.111
+.306060	+.130876	1.61282	1.95618	.136808	+5.723

X	R	M STAR	M	P/PO	THETA
+.324868	+.132690	1.62578	1.98418	.130987	+5.297
+.384033	+.137489	1.66066	2.06226	.115990	+3.977
+.450702	+.141309	1.69142	2.13469	.103582	+2.581
+.529274	+.143885	1.71801	2.20024	.093486	+1.175
+.593845	+.144722	1.73255	2.23737	.088209	+.310
+.633373	+.144829	1.73740	2.24994	.086489	+.000

TABLE 5

DESIGN MACH NUMBER= 2.5, RO = 0.1

X	R	M STAR	M	P/PO	THETA
+.028203	+.000000	1.04800	1.05845	.492816	+.000
+.002036	+.100002	1.01983	1.02394	.513616	+.117
+.037836	+.000000	1.07743	1.09519	.471151	+.000
+.004388	+.100010	1.03032	1.03673	.505862	+.251
+.046305	+.000000	1.10145	1.12571	.453557	+.000
+.006962	+.100024	1.04042	1.04911	.498404	+.399
+.054259	+.000000	1.12397	1.15479	.437154	+.000
+.009713	+.100047	1.05037	1.06139	.491065	+.557
+.061958	+.000000	1.14528	1.18274	.421730	+.000
+.012621	+.100080	1.06029	1.07371	.483755	+.723
+.069538	+.000000	1.16590	1.21020	.406916	+.000
+.015674	+.100123	1.07026	1.08618	.476418	+.898
+.077090	+.000000	1.18609	1.23750	.392529	+.000
+.018863	+.100178	1.08035	1.09888	.469005	+1.081
+.084678	+.000000	1.20605	1.26491	.378435	+.000
+.022187	+.100246	1.09061	1.11188	.461484	+1.271
+.092356	+.000000	1.22594	1.29268	.364522	+.000
+.025647	+.100329	1.10109	1.12525	.453819	+1.469
+.100173	+.000000	1.24594	1.32104	.350692	+.000
+.029246	+.100428	1.11184	1.13907	.445976	+1.675
+.108177	+.000000	1.26614	1.35018	.336886	+.000
+.032993	+.100544	1.12292	1.15342	.437918	+1.890
+.116426	+.000000	1.28670	1.38038	.323015	+.000
+.036900	+.100681	1.13439	1.16840	.429598	+2.113
+.124986	+.000000	1.30783	1.41199	.308972	+.000
+.040987	+.100840	1.14635	1.18415	.420979	+2.347
+.133952	+.000000	1.32972	1.44537	.294664	+.000
+.045285	+.101025	1.15892	1.20085	.411918	+2.593

X	R	M STAR	M	P/PO	THETA
+.143459	+.000000	1.35271	1.48120	.279905	+.000
+.049844	+.101242	1.17229	1.21879	.402353	+2.854
+.153731	+.000000	1.37733	1.52045	.264432	+.000
+.054752	+.101499	1.18676	1.23842	.392051	+3.134
+.186487	+.000000	1.45166	1.64522	.219961	+.000
+.070226	+.102466	1.23244	1.30185	.360007	+4.017
+.224067	+.000000	1.53120	1.79080	.176504	+.000
+.087481	+.103826	1.28252	1.37419	.325821	+5.000
+.270259	+.000000	1.62029	1.97225	.133438	+.000
+.107509	+.105779	1.34009	1.46143	.287972	+6.136
+.311702	+.000000	1.69117	2.13408	.103681	+.000
+.124318	+.107727	1.38715	1.53639	.258357	+7.087
+.352901	+.000000	1.75378	2.29327	.080819	+.000
+.139877	+.109783	1.42967	1.60727	.232750	+7.963
+.395694	+.000000	1.81123	2.45594	.062684	+.000
+.154851	+.111989	1.46951	1.67673	.209817	+8.802
+.407353	+.000000	1.82580	2.50018	.058511	+.000
+.158717	+.112596	1.47966	1.69493	.204149	+9.019
+.184196	+.116718	1.52461	1.77820	.179933	+9.364
+.198849	+.119132	1.54549	1.81848	.169185	+9.340
+.213646	+.121551	1.56443	1.85597	.159722	+9.234
+.228693	+.123975	1.58201	1.89161	.151185	+9.068
+.244097	+.126404	1.59854	1.92591	.143379	+8.853
+.259980	+.128841	1.61428	1.95931	.136145	+8.597
+.276484	+.131293	1.62944	1.99220	.129365	+8.302
+.293797	+.133769	1.64420	2.02491	.122943	+7.971
+.312190	+.136284	1.65875	2.05788	.116785	+7.601
+.332110	+.138869	1.67335	2.09172	.110777	+7.186

X	R	M STAR	M	P/PO	THETA
+.395288	+.146086	1.71288	2.18737	.095388	+5.849
+.467593	+.152541	1.74854	2.27927	.082609	+4.354
+.555027	+.157944	1.78136	2.36916	.071775	+2.718
+.630551	+.160736	1.80241	2.42980	.065292	+1.516
+.700831	+.162048	1.81665	2.47225	.061111	+.623
+.764893	+.162434	1.82484	2.49724	.058780	+.068
+.779588	+.162443	1.82580	2.50018	.058511	+.000

TABLE 6

DESIGN MACH NUMBER= 3.0, RO = 0.01

X	R	M STAR	M	P/PO	THETA
-.002820	+.000000	1.04800	1.05845	.492816	+.000
-.000204	+.010000	1.01983	1.02394	.513616	+.117
-.003784	+.000000	1.07743	1.09519	.471151	+.000
-.000439	+.010001	1.03032	1.03673	.505862	+.251
-.004631	+.000000	1.10145	1.12571	.453557	+.000
-.000696	+.010002	1.04042	1.04911	.498404	+.399
-.005426	+.000000	1.12397	1.15479	.437154	+.000
+.000971	+.010005	1.05037	1.06139	.491065	+.557
+.006196	+.000000	1.14528	1.18274	.421730	+.000
+.001262	+.010008	1.06029	1.07371	.483755	+.723
+.006954	+.000000	1.16590	1.21020	.406916	+.000
+.001567	+.010012	1.07026	1.08618	.476418	+.898
+.007709	+.000000	1.18609	1.23750	.392529	+.000
+.001886	+.010018	1.08035	1.09888	.469005	+1.081
+.008468	+.000000	1.20605	1.26491	.378435	+.000
+.002219	+.010025	1.09061	1.11188	.461484	+1.271
+.009236	+.000000	1.22594	1.29268	.364522	+.000
+.002565	+.010033	1.10109	1.12525	.453818	+1.469
+.010017	+.000000	1.24594	1.32104	.350692	+.000
+.002925	+.010043	1.11184	1.13907	.445976	+1.675
+.010818	+.000000	1.26614	1.35018	.336886	+.000
+.003299	+.010054	1.12292	1.15342	.437918	+1.890
+.011643	+.000000	1.28670	1.38038	.323015	+.000
+.003690	+.010068	1.13439	1.16840	.429598	+2.113
+.012499	+.000000	1.30783	1.41199	.308972	+.000
+.004099	+.010084	1.14635	1.18415	.420959	+2.347
+.013395	+.000000	1.32972	1.44537	.294664	+.000

X	R	M STAR	M	P/PO	THETA
+.004528	+.010103	1.15892	1.20085	.411918	+2.593
+.014346	+.000000	1.35271	1.48120	.279905	+.000
+.004984	+.010124	1.17229	1.21879	.402353	+2.854
+.015373	+.000000	1.37733	1.52045	.264432	+.000
+.005475	+.010150	1.18676	1.23842	.392051	+3.134
+.018649	+.000000	1.45166	1.64522	.219961	+.000
+.007023	+.010247	1.23244	1.30185	.360007	+4.017
+.022407	+.000000	1.53120	1.79080	.176504	+.000
+.008748	+.010383	1.28252	1.37419	.325821	+5.000
+.027026	+.000000	1.62029	1.97225	.133438	+.000
+.010751	+.010578	1.34009	1.46143	.287973	+6.136
+.031170	+.000000	1.69117	2.13408	.103681	+.000
+.012432	+.010773	1.38715	1.53639	.258358	+7.086
+.035290	+.000000	1.75378	2.29326	.080820	+.000
+.013988	+.010978	1.42967	1.60727	.232750	+7.963
+.039569	+.000000	1.81123	2.45594	.062684	+.000
+.015485	+.011199	1.46951	1.67673	.209817	+8.802
+.044159	+.000000	1.86525	2.62693	.048071	+.000
+.016962	+.011439	1.50776	1.74645	.188840	+9.627
+.049211	+.000000	1.91683	2.81052	.036261	+.000
+.018445	+.011701	1.54504	1.81760	.169414	+10.451
+.054584	+.000000	1.96402	3.00026	.027213	+.000
+.019873	+.011975	1.57986	1.88721	.152216	+11.240
+.021496	+.012302	1.60812	1.94615	.138953	+11.542
+.023078	+.012626	1.63096	1.99553	.128696	+11.611
+.024707	+.012960	1.65176	2.04195	.119722	+11.570
+.026398	+.013304	1.67115	2.08657	.111672	+11.447
+.028165	+.013659	1.68958	2.13026	.104302	+11.262
+.030030	+.014026	1.70732	2.17355	.097474	+11.018

X	R	M STAR	M	P/PO	THETA
+.032023	+.014409	1.72467	2.21713	.091048	+10.720
+.034194	+.014813	1.74197	2.26190	.084886	+10.363
+.041170	+.016010	1.78854	2.38957	.069523	+9.115
+.049328	+.017209	1.83073	2.51543	.057140	+7.601
+.059473	+.018402	1.87072	2.64537	.046722	+5.813
+.068567	+.019212	1.89826	2.74186	.040276	+4.365
+.077482	+.019794	1.91956	2.82089	.035692	+3.108
+.086473	+.020196	1.93649	2.88675	.032293	+2.017
+.095634	+.020445	1.94972	2.94026	.029783	+1.092
+.104826	+.020563	1.95926	2.98000	.028053	+.377
+.112822	+.020589	1.96400	3.00017	.027217	+.000

TABLE 7

DESIGN MACH NUMBER= 4.0, RO = 0.01

X	R	M STAR	M	P/PO	THETA
+.002820	+.000000	1.04800	1.05845	.492816	+.000
+.000204	+.010000	1.01983	1.02394	.513616	+.117
+.003784	+.000000	1.07743	1.09519	.471151	+.000
+.000439	+.010001	1.03032	1.03673	.505862	+.251
+.004631	+.000000	1.10145	1.12571	.453557	+.000
+.000696	+.010002	1.04042	1.04911	.498404	+.399
+.005426	+.000000	1.12397	1.15479	.437154	+.000
+.000971	+.010005	1.05037	1.06139	.491065	+.557
+.006196	+.000000	1.14528	1.18274	.421730	+.000
+.001262	+.010008	1.06029	1.07371	.483755	+.723
+.006954	+.000000	1.16590	1.21020	.406916	+.000
+.001567	+.010012	1.07026	1.08618	.476418	+.898
+.007709	+.000000	1.18609	1.23750	.392529	+.000
+.001886	+.010018	1.08035	1.09888	.469005	+1.081
+.008468	+.000000	1.20605	1.26491	.378435	+.000
+.002219	+.010025	1.09061	1.11188	.461484	+1.271
+.009236	+.000000	1.22594	1.29268	.364522	+.000
+.002565	+.010033	1.10109	1.12525	.453818	+1.469
+.010017	+.000000	1.24594	1.32104	.350692	+.000
+.002925	+.010043	1.11184	1.13907	.445976	+1.675
+.010818	+.000000	1.26614	1.35018	.336886	+.000
+.003299	+.010054	1.12292	1.15342	.437918	+1.890
+.011643	+.000000	1.28670	1.38038	.323015	+.000
+.003690	+.010068	1.13439	1.16840	.429598	+2.113
+.012499	+.000000	1.30783	1.41199	.308972	+.000

X	R	M STAR	M	P/PO	THETA
+.004099	+.010084	1.14635	1.18415	.420959	+2.347
+.013395	+.000000	1.32972	1.44537	.294664	+.000
+.004528	+.010103	1.15892	1.20085	.411918	+2.593
+.014346	+.000000	1.35271	1.48120	.279905	+.000
+.004984	+.010124	1.17229	1.21879	.402353	+2.854
+.015373	+.000000	1.37733	1.52045	.264432	+.000
+.005475	+.010150	1.18676	1.23842	.392051	+3.134
+.018649	+.000000	1.45166	1.64522	.219961	+.000
+.007023	+.010247	1.23244	1.30185	.360007	+4.017
+.022407	+.000000	1.53120	1.79080	.176504	+.000
+.008748	+.010383	1.28252	1.37419	.325821	+5.000
+.027026	+.000000	1.62029	1.97225	.133438	+.000
+.010751	+.010578	1.34009	1.46143	.287973	+6.136
+.031170	+.000000	1.69117	2.13408	.103681	+.000
+.012432	+.010773	1.38715	1.53639	.258358	+7.086
+.035290	+.000000	1.75378	2.29326	.080820	+.000
+.013988	+.010978	1.42967	1.60727	.232750	+7.963
+.039569	+.000000	1.81123	2.45594	.062684	+.000
+.015485	+.011199	1.46951	1.67673	.209817	+8.802
+.044159	+.000000	1.86525	2.62693	.048071	+.000
+.016962	+.011439	1.50776	1.74645	.188840	+9.627
+.049211	+.000000	1.91683	2.81052	.036261	+.000
+.018445	+.011701	1.54504	1.81760	.169414	+10.451
+.054904	+.000000	1.96660	3.01134	.026765	+.000
+.019954	+.011991	1.58179	1.89116	.151291	+11.285
+.061471	+.000000	2.01495	3.23484	.019220	+.000
+.021505	+.012312	1.61835	1.96806	.134309	+12.137
+.069244	+.000000	2.06215	3.48812	.013334	+.000

X	R	M STAR	M	P/PO	THETA
+.023117	+.012672	1.65498	2.04927	.118363	+13.016
+.078708	+.000000	2.10836	3.70086	.008858	+.000
+.024808	+.013077	1.69193	2.13593	.103382	+13.932
+.086192	+.000000	2.13810	4.00008	.006585	+.000
+.025971	+.013373	1.71649	2.19643	.094046	+14.559
+.028501	+.014038	1.75253	2.28991	.081246	+14.914
+.030531	+.014579	1.77607	2.35428	.073464	+14.945
+.032723	+.015163	1.79835	2.41790	.066515	+14.861
+.035138	+.015799	1.82009	2.48270	.060125	+14.682
+.043051	+.017806	1.87698	2.66676	.045205	+13.780
+.052604	+.020032	1.92718	2.85019	.034136	+12.447
+.064919	+.022554	1.97432	3.04495	.025452	+10.707
+.076375	+.024564	2.00712	3.19642	.020335	+9.196
+.088028	+.026305	2.03329	3.32858	.016767	+7.799
+.100284	+.027841	2.05529	3.44874	.014104	+6.483
+.113472	+.029193	2.07430	3.56027	.012039	+5.228
+.127877	+.030360	2.09099	3.66473	.010400	+4.034
+.143762	+.031323	2.10559	3.76179	.009093	+2.904
+.161339	+.032054	2.11812	3.84978	.008063	+1.861
+.180625	+.032527	2.12835	3.92513	.007281	+.946
+.200903	+.032738	2.13566	3.98098	.006755	+.247
+.213091	+.032764	2.13810	4.00008	.006585	+. 000

TABLE 8

DESIGN MACH NUMBER= 5.0, RO = 0.01

X	R	M STAR	M	P/PO	THETA
+.002820	+.000000	1.04800	1.05845	.492816	+.000
+.000204	+.010000	1.01983	1.02394	.513616	+.117
+.003784	+.000000	1.07743	1.09519	.471151	+.000
+.000439	+.010001	1.03032	1.03673	.505862	+.251
+.004631	+.000000	1.10145	1.12571	.453557	+.000
+.000696	+.010002	1.04042	1.04911	.498404	+.399
+.005426	+.000000	1.12397	1.15479	.437154	+.000
+.000971	+.010005	1.05037	1.06139	.491065	+.557
+.006196	+.000000	1.14528	1.18274	.421730	+.000
+.001262	+.010008	1.06029	1.07371	.483755	+.723
+.006954	+.000000	1.16590	1.21020	.406916	+.000
+.001567	+.010012	1.07026	1.08618	.476418	+.898
+.007709	+.000000	1.18609	1.23750	.392529	+.000
+.001886	+.010018	1.08035	1.09888	.469005	+1.081
+.008468	+.000000	1.20605	1.26491	.378435	+.000
+.002219	+.010025	1.09061	1.11188	.461484	+1.271
+.009236	+.000000	1.22594	1.29268	.364522	+.000
+.002565	+.010033	1.10109	1.12525	.453818	+1.469
+.010017	+.000000	1.24594	1.32104	.350692	+.000
+.002925	+.010043	1.11184	1.13907	.445976	+1.675
+.010818	+.000000	1.26614	1.35018	.336886	+.000
+.003299	+.010054	1.12292	1.15342	.437918	+1.890
+.011643	+.000000	1.28670	1.38038	.323015	+.000
+.003690	+.010068	1.13439	1.16840	.429598	+2.113
+.012499	+.000000	1.30783	1.41199	.308972	+.000

X	R	M STAR	M	P/PO	THETA
+.004099	+.010084	1.14635	1.18415	.420959	+2.347
+.013395	+.000000	1.32972	1.44537	.294664	+.000
+.004528	+.010103	1.15892	1.20085	.411918	+2.593
+.014346	+.000000	1.35271	1.48120	.279905	+.000
+.004984	+.010124	1.17229	1.21879	.402353	+2.854
+.015373	+.000000	1.37733	1.52045	.264432	+.000
+.005475	+.010150	1.18676	1.23842	.392051	+3.134
+.018649	+.000000	1.45166	1.64522	.219961	+.000
+.007023	+.010247	1.23244	1.30185	.360007	+4.017
+.022407	+.000000	1.53120	1.79080	.176504	+.000
+.008748	+.010383	1.28252	1.37419	.325821	+5.000
+.027026	+.000000	1.62029	1.97225	.133438	+.000
+.010751	+.010578	1.34009	1.46143	.287973	+6.136
+.031170	+.000000	1.69117	2.13408	.103681	+.000
+.012432	+.010773	1.38715	1.53639	.258358	+7.086
+.035290	+.000000	1.75378	2.29326	.080820	+.000
+.013988	+.010978	1.42967	1.60727	.232750	+7.963
+.039569	+.000000	1.81123	2.45594	.062684	+.000
+.015485	+.011199	1.46951	1.67673	.209817	+8.802
+.044159	+.000000	1.86525	2.62693	.048071	+.000
+.016962	+.011439	1.50776	1.74645	.188840	+9.627
+.049211	+.000000	1.91683	2.81052	.036261	+.000
+.018445	+.011701	1.54504	1.81760	.169414	+10.451
+.054904	+.000000	1.96660	3.01134	.026765	+.000
+.019954	+.011991	1.58179	1.89116	.151291	+11.285
+.061471	+.000000	2.01495	3.23484	.019220	+.000

X	R	M STAR	M	P/PO	THETA
+.021505	+.012312	1.61835	1.96806	.134309	+12.137
+.069244	+.000000	2.06215	3.48812	.013334	+.000
+.023117	+.012672	1.65498	2.04927	.118363	+13.016
+.078708	+.000000	2.10836	3.78086	.008858	+.000
+.024808	+.013077	1.69193	2.13593	.103382	+13.932
+.090637	+.000000	2.15371	4.12720	.005567	+.000
+.026601	+.013538	1.72948	2.22945	.089309	+14.896
+.106324	+.000000	2.19825	4.54881	.003252	+.000
+.028526	+.014069	1.76791	2.33164	.076110	+15.921
+.124723	+.000000	2.23610	5.00043	.001889	+.000
+.030331	+.014600	1.80220	2.42917	.065355	+16.873
+.032922	+.015394	1.83451	2.52727	.056099	+17.209
+.035480	+.016187	1.86034	2.61058	.049302	+17.253
+.044003	+.018793	1.92521	2.84256	.034534	+16.738
+.054547	+.021852	1.98074	3.07347	.024393	+15.627
+.068502	+.025546	2.03184	3.32098	.016952	+14.023
+.081824	+.028693	2.06698	3.51645	.012809	+12.563
+.095690	+.031608	2.09490	3.69020	.010038	+11.178
+.110608	+.034375	2.11842	3.85191	.008039	+9.842
+.127043	+.037034	2.13894	4.00673	.006527	+8.538
+.145467	+.039590	2.15724	4.15726	.005352	+7.255
+.166422	+.042023	2.17378	4.30529	.004419	+5.994
+.190551	+.044293	2.18879	4.45086	.003674	+4.753
+.218623	+.046329	2.20236	4.59297	.003079	+3.542
+.251500	+.048030	2.21440	4.72875	.002609	+2.382
+.289938	+.049271	2.22464	4.85235	.002249	+1.316
+.333503	+.049938	2.23246	4.95215	.001999	+.438
+.370073	+.050077	2.23610	5.00043	.001889	+.000

PART II ANNULAR NOZZLE PROFILES

TABLE 9
DESIGN MACH NUMBER = 1.50

9– A RO =0.1 RS =0.05

X	R	M STAR	M	P/PO	THETA
+.010795	+.050000	1.02211	1.02671	.511935	+.000
+.000958	+.100000	1.01427	1.01719	.517731	+.055
+.013931	+.050000	1.03318	1.04022	.503753	+.000
+.002020	+.100002	1.01979	1.02389	.513650	+.116
+.016812	+.050000	1.04324	1.05258	.496324	+.000
+.003159	+.100005	1.02507	1.03032	.509742	+.181
+.019557	+.050000	1.05273	1.06431	.489329	+.000
+.004360	+.100010	1.03022	1.03660	.505940	+.250
+.020223	+.050000	1.06182	1.07562	.482628	+.000
+.005615	+.100016	1.03527	1.04278	.502209	+.322
+.024841	+.050000	1.07064	1.08665	.476139	+.000
+.006918	+.100024	1.04026	1.04891	.498523	+.396
+.027432	+.050000	1.07925	1.09749	.469812	+.000
+.008265	+.100034	1.04522	1.05502	.494866	+.474
+.030009	+.050000	1.08771	1.10819	.463612	+.000
+.009653	+.100047	1.05015	1.06112	.491227	+.553
+.032580	+.050000	1.09604	1.11879	.457511	+.000
+.011079	+.100061	1.05508	1.06723	.487595	+.635
+.035154	+.050000	1.10428	1.12934	.451491	+.000
+.012542	+.100079	1.06001	1.07336	.483963	+.719
+.037736	+.050000	1.11245	1.13985	.445535	+.000

X	R	M STAR	M	P/PO	THETA
+.014041	+.100099	1.06495	1.07953	.480325	+.804
+.040330	+.050000	1.12056	1.15036	.439628	+.000
+.015574	+.100121	1.06991	1.08574	.476674	+.892
+.042940	+.050000	1.12864	1.16088	.433762	+.000
+.017141	+.100147	1.07491	1.09201	.473006	+.982
+.045570	+.050000	1.13670	1.17144	.427925	+.000
+.018741	+.100170	1.07993	1.09834	.469316	+1.074
+.048223	+.050000	1.14476	1.18204	.422108	+.000
+.020374	+.100208	1.08500	1.10475	.465600	+1.167
+.050902	+.050000	1.15282	1.19272	.416304	+.000
+.022040	+.100243	1.09011	1.11124	.461854	+1.263
+.062872	+.050000	1.19061	1.24367	.389326	+.000
+.029451	+.100434	1.11557	1.14389	.443260	+1.687
+.071754	+.050000	1.21836	1.28205	.369805	+.000
+.035032	+.100614	1.13475	1.16888	.429335	+2.006
+.079453	+.050000	1.24218	1.31567	.353280	+.000
+.039896	+.100796	1.15148	1.19095	.417265	+2.285
+.086536	+.050000	1.26383	1.34683	.338455	+.000
+.044379	+.100985	1.16685	1.21148	.406234	+2.541
+.093256	+.050000	1.28411	1.37655	.324752	+.000
+.048631	+.101183	1.18138	1.23109	.395876	+2.784
+.099751	+.050000	1.30345	1.40539	.311865	+.000
+.052734	+.101390	1.19532	1.25012	.385997	+3.019
+.106108	+.050000	1.32212	1.43370	.299606	+.000
+.056736	+.101610	1.20884	1.26878	.376474	+3.247
+.112386	+.050000	1.34027	1.46172	.287851	+.000
+.060674	+.101841	1.22205	1.28722	.367229	+3.472
+.118627	+.050000	1.35805	1.48963	.276518	+.000

X	R	M STAR	M	P/PO	THETA
+.064569	+.102085	1.23504	1.30553	.358207	+3.694
+.120945	+.050000	1.36460	1.50004	.272386	+.000
+.066009	+.102179	1.23984	1.31235	.354889	+3.777
+.072258	+.102584	1.24829	1.32441	.349072	+3.651
+.076055	+.102824	1.25329	1.33160	.345643	+3.567
+.079832	+.103056	1.25817	1.33862	.342312	+3.479
+.083599	+.103282	1.26293	1.34552	.339068	+3.387
+.087363	+.103502	1.26759	1.35230	.335900	+3.292
+.091132	+.103715	1.27217	1.35898	.332800	+3.193
+.107788	+.104572	1.29188	1.38807	.319553	+2.693
+.119890	+.105099	1.30535	1.40824	.310611	+2.297
+.130235	+.105482	1.31628	1.42479	.303419	+1.942
+.139644	+.105773	1.32576	1.43929	.297231	+1.609
+.148480	+.105997	1.33427	1.45240	.291718	+1.291
+.156940	+.106165	1.34206	1.46450	.286708	+.984
+.165144	+.106284	1.34927	1.47578	.282095	+.685
+.173173	+.106360	1.35601	1.48640	.277812	+.392
+.181082	+.106394	1.36234	1.49643	.273814	+.106
+.184002	+.106397	1.36460	1.50004	.272388	+.000

9 – B RO =0.1 RS =0.04

X	R	M STAR	M	P/PO	THETA
+.013648	+.040000	1.02558	1.03094	.509366	+.000
+.001165	+.100001	1.01540	1.01857	.516891	+.067
+.017818	+.040000	1.03914	1.04753	.499351	+.000
+.002470	+.100003	1.02193	1.02650	.512063	+.142
+.021603	+.040000	1.05142	1.06269	.490292	+.000
+.003877	+.100008	1.02819	1.03412	.507440	+.222
+.025194	+.040000	1.06298	1.07706	.481777	+.000
+.005365	+.100014	1.03429	1.04158	.502935	+.307
+.028674	+.040000	1.07407	1.09096	.473620	+.000
+.006925	+.100024	1.04029	1.04895	.498503	+.397
+.032091	+.040000	1.08483	1.10454	.465723	+.000
+.008548	+.100037	1.04624	1.05628	.494114	+.490
+.035472	+.040000	1.09535	1.11791	.458018	+.000
+.010230	+.100052	1.05216	1.06361	.489746	+.586
+.038838	+.040000	1.10569	1.13115	.450461	+.000
+.011966	+.100072	1.05808	1.07096	.485384	+.686
+.042203	+.040000	1.11590	1.14432	.443017	+.000
+.013753	+.100095	1.06401	1.07836	.481016	+.788
+.045577	+.040000	1.12603	1.15747	.435660	+.000
+.015591	+.100122	1.06997	1.08582	.476631	+.893
+.048968	+.040000	1.13609	1.17062	.428372	+.000
+.017478	+.100153	1.07597	1.09336	.472222	+1.001
+.052385	+.040000	1.14611	1.18384	.421129	+.000
+.019412	+.100188	1.08202	1.10099	.467779	+1.112
+.055833	+.040000	1.15613	1.19714	.413919	+.000
+.021394	+.100229	1.08814	1.10874	.463296	+1.226
+.059319	+.040000	1.16617	1.21055	.406726	+.000
+.023423	+.100274	1.09432	1.11661	.458766	+1.342

X	R	M STAR	M	P/PO	THETA
+.062850	+.040000	1.17623	1.22412	.399536	+.000
+.025501	+.100325	1.10059	1.12462	.454181	+1.461
+.066431	+.040000	1.18636	1.23787	.392338	+.000
+.027628	+.100382	1.10696	1.13278	.449534	+1.583
+.084309	+.040000	1.23833	1.31019	.355937	+.000
+.038224	+.100731	1.14129	1.17747	.424608	+2.189
+.097036	+.040000	1.27466	1.36263	.331117	+.000
+.045832	+.101050	1.16593	1.21024	.406892	+2.624
+.108017	+.040000	1.30545	1.40840	.310543	+.000
+.052389	+.101372	1.18715	1.23895	.391776	+2.999
+.118151	+.040000	1.33333	1.45095	.292325	+.000
+.058413	+.101706	1.20656	1.26563	.378071	+3.343
+.127824	+.040000	1.35941	1.49178	.275661	+.000
+.064124	+.102056	1.22487	1.29117	.365269	+3.669
+.129766	+.040000	1.36460	1.50004	.272387	+.000
+.065263	+.102130	1.22853	1.29633	.362720	+3.734
+.074938	+.102749	1.24159	1.31483	.353684	+3.596
+.080128	+.103071	1.24830	1.32442	.349070	+3.506
+.085230	+.103380	1.25469	1.33360	.344689	+3.409
+.090271	+.103675	1.26082	1.34247	.340501	+3.305
+.095272	+.103959	1.26674	1.35106	.336479	+3.195
+.100251	+.104232	1.27246	1.35942	.332598	+3.080
+.105224	+.104495	1.27803	1.36758	.328841	+2.960
+.110203	+.104746	1.28345	1.37557	.325195	+2.835
+.115202	+.104988	1.28875	1.38342	.321644	+2.705
+.120230	+.105220	1.29394	1.39114	.318179	+2.571
+.144957	+.106174	1.31802	1.42744	.302283	+1.850
+.162141	+.106650	1.33306	1.45053	.292501	+1.320
+.176709	+.106928	1.34477	1.46873	.284971	+.865
+.189938	+.107080	1.35455	1.48410	.278737	+.454
+.202362	+.107138	1.36300	1.49749	.273396	+.075
+.204833	+.107139	1.36460	1.50004	.272388	+.000

9 – C RO = 0.1 RS = 0.03

X	R	M STAR	M	P/PO	THETA
+.016763	+.030000	1.02956	1.03579	.506428	+.000
+.001377	+.100001	1.01652	1.01992	.516064	+.079
+.022088	+.030000	1.04587	1.05583	.494384	+.000
+.002933	+.100004	1.02405	1.02908	.510495	+.168
+.026879	+.030000	1.06058	1.07408	.483539	+.000
+.004617	+.100011	1.03127	1.03789	.505161	+.265
+.031408	+.030000	1.07442	1.09140	.473366	+.000
+.006405	+.100021	1.03832	1.04653	.499954	+.367
+.035793	+.030000	1.08768	1.10815	.463632	+.000
+.008283	+.100034	1.04528	1.05510	.494817	+.475
+.040098	+.030000	1.10055	1.12456	.454212	+.000
+.010242	+.100052	1.05220	1.06366	.489715	+.587
+.044364	+.030000	1.11316	1.14078	.445013	+.000
+.012274	+.100075	1.05912	1.07225	.484620	+.703
+.048616	+.030000	1.12556	1.15685	.436001	+.000
+.014377	+.100103	1.06605	1.08091	.479513	+.824
+.052876	+.030000	1.13783	1.17292	.427109	+.000
+.016548	+.100137	1.07304	1.08966	.474380	+.948
+.057158	+.030000	1.15003	1.18902	.418309	+.000
+.018784	+.100176	1.08008	1.09853	.469207	+1.076
+.061476	+.030000	1.16219	1.20522	.409573	+.000
+.021086	+.100222	1.08720	1.10755	.463981	+1.208
+.065842	+.030000	1.17436	1.22158	.400876	+.000
+.023453	+.100275	1.09443	1.11673	.458693	+1.343
+.070267	+.030000	1.18656	1.23815	.392193	+.000
+.025885	+.100335	1.10176	1.12611	.453329	+1.483

X	R	M STAR	M	P/PO	THETA
+.074762	+.030000	1.19884	1.25497	.383505	+.000
+.028386	+.100403	1.10923	1.13570	.447878	+1.626
+.079340	+.030000	1.21124	1.27212	.374789	+.000
+.030957	+.100479	1.11685	1.14555	.442328	+1.773
+.084013	+.030000	1.22379	1.28965	.366021	+.000
+.033603	+.100565	1.12464	1.15567	.436663	+1.925
+.109702	+.030000	1.29329	1.39017	.318616	+.000
+.048100	+.101157	1.16973	1.21535	.404176	+2.754
+.127389	+.030000	1.33975	1.46091	.288188	+.000
+.058068	+.101686	1.20064	1.25745	.382236	+3.323
+.137045	+.030000	1.36462	1.50008	.272373	+.000
+.063454	+.102013	1.21741	1.28072	.370469	+3.631
+.074300	+.102693	1.23236	1.30173	.360063	+3.545
+.081522	+.103135	1.24175	1.31506	.353577	+3.456
+.088424	+.103546	1.25031	1.32731	.347685	+3.352
+.095112	+.103931	1.25828	1.33879	.342236	+3.236
+.101653	+.104293	1.26576	1.34964	.337140	+3.111
+.108101	+.104636	1.27287	1.36000	.332327	+2.978
+.114491	+.104961	1.27965	1.36996	.327750	+2.839
+.120852	+.105268	1.28616	1.37958	.323378	+2.693
+.127210	+.105559	1.29244	1.38891	.319178	+2.542
+.133585	+.105833	1.29852	1.39799	.315133	+2.386
+.139998	+.106091	1.30442	1.40685	.311223	+2.224
+.146470	+.106333	1.31017	1.41552	.307434	+2.058
+.153019	+.106559	1.31577	1.42402	.303752	+1.887
+.188174	+.107426	1.34276	1.46560	.286256	+.937
+.211517	+.107681	1.35766	1.48902	.276763	+.316
+.223937	+.107715	1.36460	1.50004	.272388	+.000

9 – D RO = 0.1 RS = 0.025

X	R	M STAR	M	P/PO	THETA
+.018429	+.025000	1.03180	1.03853	.504773	+.000
+.001484	+.100001	1.01708	1.02060	.515652	+.085
+.024379	+.025000	1.04963	1.06048	.491610	+.000
+.003169	+.100005	1.02511	1.03036	.509716	+.182
+.029712	+.025000	1.06568	1.08043	.479792	+.000
+.004996	+.100012	1.03281	1.03976	.504029	+.286
+.034746	+.025000	1.08074	1.09936	.468725	+.000
+.006938	+.100024	1.04033	1.04900	.498470	+.397
+.039620	+.025000	1.09517	1.11768	.458148	+.000
+.008979	+.100040	1.04778	1.05818	.492977	+.514
+.044406	+.025000	1.10918	1.13564	.447916	+.000
+.011111	+.100062	1.05519	1.06737	.487514	+.637
+.049151	+.025000	1.12289	1.15339	.437934	+.000
+.013325	+.100089	1.06261	1.07661	.482047	+.763
+.053887	+.025000	1.13641	1.17105	.428137	+.000
+.015619	+.100122	1.07007	1.08594	.476558	+.895
+.058636	+.025000	1.14980	1.18871	.418476	+.000
+.017989	+.100162	1.07760	1.09540	.471030	+1.031
+.063418	+.025000	1.16312	1.20646	.408910	+.000
+.020435	+.100209	1.08521	1.10502	.465446	+1.171
+.068249	+.025000	1.17642	1.22437	.399402	+.000
+.022955	+.100263	1.09292	1.11482	.459793	+1.315
+.073144	+.025000	1.18976	1.24251	.389928	+.000
+.025551	+.100326	1.10077	1.12483	.454057	+1.464
+.078119	+.025000	1.20317	1.26093	.380458	+.000
+.028225	+.100398	1.10876	1.13510	.448222	+1.617
+.083188	+.025000	1.21671	1.27974	.370960	+.000
+.030980	+.100480	1.11693	1.14564	.442273	+1.774
+.088369	+.025000	1.23042	1.29899	.361409	+.000

X	R	M STAR	M	P/PO	THETA
+.033819	+.100572	1.12529	1.15651	.436194	+1.937
+.093682	+.025000	1.24436	1.31879	.351773	+.000
+.036751	+.100675	1.13389	1.16774	.429961	+2.105
+.124188	+.025000	1.32415	1.43681	.298283	+.000
+.053512	+.101432	1.18520	1.23629	.393157	+3.063
+.140119	+.025000	1.36464	1.50010	.272363	+.000
+.062190	+.101934	1.21181	1.27291	.374387	+3.559
+.074289	+.102680	1.22879	1.29668	.362545	+3.501
+.082859	+.103198	1.23995	1.31250	.354814	+3.411
+.090880	+.103668	1.24984	1.32663	.348013	+3.301
+.098550	+.104102	1.25883	1.33958	.341861	+3.177
+.105989	+.104506	1.26716	1.35167	.336194	+3.041
+.113276	+.104884	1.27496	1.36308	.330908	+2.896
+.120466	+.105238	1.28235	1.37394	.325934	+2.743
+.127602	+.105570	1.28938	1.38436	.321221	+2.584
+.134718	+.105881	1.29612	1.39439	.316732	+2.420
+.141843	+.106171	1.30259	1.40409	.312436	+2.250
+.149004	+.106442	1.30883	1.41350	.308312	+2.075
+.156226	+.106692	1.31488	1.42266	.304339	+1.895
+.163536	+.106922	1.32074	1.43160	.300503	+1.712
+.170962	+.107132	1.32644	1.44033	.296789	+1.523
+.212245	+.107855	1.35377	1.48286	.279233	+.482
+.232854	+.107941	1.36460	1.50004	.272388	+.000

9 – E RO = 0.1 RS = 0.02

X	R	M STAR	M	P/P0	THETA
+.020177	+.020000	1.03426	1.04155	.502954	+.000
+.001593	+.100001	1.01763	1.02127	.515242	+.091
+.026785	+.020000	1.05374	1.06557	.488579	+.000
+.003407	+.100006	1.02616	1.03164	.508941	+.195
+.032686	+.020000	1.07121	1.08736	.475723	+.000
+.005379	+.100014	1.03434	1.04164	.502900	+.308
+.038251	+.020000	1.08757	1.10802	.463710	+.000
+.007477	+.100028	1.04234	1.05148	.496987	+.428
+.043637	+.020000	1.10325	1.12801	.452245	+.000
+.009686	+.100047	1.05027	1.06127	.491137	+.555
+.048930	+.020000	1.11845	1.14762	.441164	+.000
+.011995	+.100072	1.05818	1.07109	.485308	+.687
+.054182	+.020000	1.13334	1.16703	.430357	+.000
+.014396	+.100104	1.06612	1.08099	.479465	+.825
+.059429	+.020000	1.14802	1.18636	.419753	+.000
+.016885	+.100143	1.07411	1.09102	.473587	+.967
+.064698	+.020000	1.16258	1.20575	.409292	+.000
+.019461	+.100189	1.08220	1.10121	.467654	+1.115
+.070014	+.020000	1.17709	1.22528	.398924	+.000
+.022122	+.100245	1.09039	1.11159	.461648	+1.267
+.075395	+.020000	1.19161	1.24503	.388620	+.000
+.024869	+.100309	1.09872	1.12222	.455552	+1.425
+.080861	+.020000	1.20619	1.26511	.378332	+.000
+.027704	+.100384	1.10722	1.13311	.449348	+1.587
+.086432	+.020000	1.22091	1.28561	.368030	+.000
+.030630	+.100469	1.11590	1.14432	.443018	+1.754

X	R	M STAR	M	P/PO	THETA
+.092130	+.020000	1.23581	1.30662	.357676	+.000
+.033653	+.100566	1.12481	1.15588	.436541	+1.927
+.097981	+.020000	1.25097	1.32825	.347237	+.000
+.036780	+.100676	1.13399	1.16787	.429892	+2.106
+.104014	+.020000	1.26646	1.35066	.336663	+.000
+.040021	+.100801	1.14347	1.18034	.423040	+2.292
+.140095	+.020000	1.35771	1.48910	.276732	+.000
+.059287	+.101757	1.20169	1.25889	.381499	+3.393
+.142858	+.020000	1.36460	1.50003	.272391	+.000
+.060739	+.101845	1.20616	1.26506	.378357	+3.476
+.082386	+.103142	1.23629	1.30729	.357347	+3.384
+.091860	+.103693	1.24800	1.32400	.349271	+3.270
+.100729	+.104189	1.25834	1.33887	.342196	+3.136
+.109215	+.104643	1.26770	1.35246	.335823	+2.988
+.117453	+.105062	1.27635	1.36510	.329976	+2.830
+.125529	+.105449	1.28442	1.37700	.324545	+2.664
+.133509	+.105808	1.29203	1.38829	.319454	+2.491
+.141440	+.106141	1.29925	1.39908	.314649	+2.312
+.149361	+.106448	1.30614	1.40942	.310092	+2.128
+.157308	+.106730	1.31273	1.41939	.305751	+1.940
+.165313	+.106988	1.31906	1.42902	.301602	+1.748
+.173408	+.107221	1.32515	1.43835	.297627	+1.552
+.181628	+.107429	1.33104	1.44740	.293810	+1.352
+.190013	+.107613	1.33672	1.45620	.290137	+1.150
+.237882	+.108122	1.36307	1.49761	.273348	+.071
+.241388	+.108125	1.36460	1.50004	.272388	+.000

TABLE 10 DESIGN MACH NUMBER = 1.75

10 - A RO =0.1 RS =0.05

X	R	M STAR	M	P/PO	THETA
+.010795	+.050000	1.02211	1.02671	.511935	+.000
+.000958	+.100000	1.01427	1.01719	.517731	+.055
+.013931	+.050000	1.03318	1.04022	.503753	+.000
+.002020	+.100002	1.01979	1.02389	.513650	+.116
+.016812	+.050000	1.04324	1.05258	.496324	+.000
+.003159	+.100005	1.02507	1.03032	.509742	+.181
+.019557	+.050000	1.05273	1.06431	.489329	+.000
+.004360	+.100010	1.03022	1.03660	.505940	+.250
+.022223	+.050000	1.06182	1.07562	.482628	+.000
+.005615	+.100016	1.03527	1.04278	.502209	+.322
+.024841	+.050000	1.07064	1.08665	.476139	+.000
+.006918	+.100024	1.04026	1.04891	.498523	+.396
+.027432	+.050000	1.07925	1.09749	.469812	+.000
+.008265	+.100034	1.04522	1.05502	.494866	+.474
+.030009	+.050000	1.08771	1.10819	.463612	+.000
+.009653	+.100047	1.05015	1.06112	.491227	+.553
+.032580	+.050000	1.09604	1.11879	.457511	+.000
+.011079	+.100061	1.05508	1.06723	.487595	+.635
+.035154	+.050000	1.10428	1.12934	.451491	+.000
+.012542	+.100079	1.06001	1.07336	.483963	+.719
+.037736	+.050000	1.11245	1.13985	.445535	+.000
+.014041	+.100099	1.06495	1.07953	.480325	+.804
+.040330	+.050000	1.12056	1.15036	.439628	+.000
+.015574	+.100121	1.06991	1.08574	.476674	+.892
+.042940	+.050000	1.12864	1.16088	.433762	+.000
+.017141	+.100147	1.07491	1.09201	.473006	+.982

X	R	M STAR	M	P/PO	THETA
+.045570	+.050000	1.13670	1.17144	.427925	+.000
+.018741	+.10010000	1.07993	1.09834	.469316	+1.074
+.048223	+.050000	1.14476	1.18204	.422108	+.000
+.020374	+.100208	1.08500	1.10475	.465600	+1.167
+.050902	+.050000	1.15282	1.19272	.416304	+.000
+.022040	+.100243	1.09011	1.11124	.461854	+1.263
+.062872	+.050000	1.19061	1.24367	.389326	+.000
+.029451	+.100434	1.11507	1.14389	.443260	+1.687
+.071754	+.050000	1.21836	1.28205	.369805	+.000
+.035032	+.100614	1.13475	1.16888	.429335	+2.006
+.079453	+.050000	1.24218	1.31567	.353280	+.000
+.039896	+.100796	1.15148	1.19095	.417265	+2.285
+.086536	+.050000	1.26383	1.34683	.338455	+.000
+.044379	+.100985	1.16685	1.21148	.406234	+2.541
+.093256	+.050000	1.28411	1.37655	.324752	+.000
+.048631	+.101183	1.18138	1.23109	.395876	+2.784
+.099751	+.050000	1.30345	1.40539	.311865	+.000
+.052734	+.101390	1.19532	1.25012	.385997	+3.019
+.106108	+.050000	1.32212	1.43370	.299606	+.000
+.056736	+.101610	1.20884	1.26878	.376474	+3.247
+.112386	+.050000	1.34027	1.46172	.287851	+.000
+.000674	+.101841	1.22205	1.28722	.367229	+3.472
+.118627	+.050000	1.35805	1.48963	.276518	+.000
+.064569	+.102085	1.23504	1.30553	.358207	+3.694
+.124866	+.050000	1.37554	1.51757	.265543	+.000
+.068440	+.102342	1.24786	1.32380	.349368	+3.915
+.131129	+.050000	1.39281	1.54565	.254882	+.000
+.072301	+.102614	1.26056	1.34208	.340681	+4.135
+.137442	+.050000	1.40993	1.57396	.244498	+.000
+.076165	+.102901	1.27317	1.36045	.332121	+4.356
+.143824	+.050000	1.42692	1.60260	.234367	+.000
+.080039	+.103203	1.28572	1.37893	.323671	+4.576

X	R	M STAR	M	P/PO	THETA
+.150295	+.050000	1.44385	1.63164	.224465	+.000
+.083932	+.103522	1.29825	1.39758	.315314	+4.798
+.156874	+.050000	1.46074	1.66116	.214775	+.000
+.087854	+.103859	1.31077	1.41643	.307037	+5.021
+.163582	+.050000	1.47762	1.69125	.205283	+.000
+.091810	+.104215	1.32331	1.43552	.298829	+5.246
+.176454	+.050000	1.50968	1.75004	.187812	+.000
+.099217	+.104922	1.34726	1.47264	.283376	+5.666
+.122575	+.107110	1.37821	1.52189	.263882	+5.038
+.133727	+.108059	1.39187	1.54411	.255458	+4.691
+.143905	+.108865	1.40373	1.56365	.248236	+4.357
+.153497	+.109568	1.41440	1.58145	.241815	+4.032
+.162712	+.110192	1.42420	1.59798	.235975	+3.712
+.171683	+.110749	1.43335	1.61356	.230586	+3.394
+.180495	+.111247	1.44196	1.62837	.225561	+3.079
+.189211	+111692	1.45013	1.64255	.220839	+2.766
+.197878	+.112087	1.45792	1.65620	.216379	+2.453
+.206534	+.112434	1.46538	1.66937	.212148	+2.140
+.215212	+.112735	1.47254	1.68213	.208121	+1.828
+.223934	+.112989	1.47943	1.69450	.204281	+1.517
+.232726	+.113198	1.48606	1.70651	.200612	+1.205
+.241609	+.113361	1.49246	1.71818	.197105	+.895
+.250602	+.113477	1.49863	1.72952	.193751	+.584
+.267748	+.113565	1.50970	1.75008	.187802	+.000

10 - B RO =0.1 RS =0.04

X	R	M STAR	M	P/PO	THETA
+.013648	+.040000	1.02558	1.03094	.509366	+.000
+.001165	+.100001	1.01540	1.01857	.516891	+.067
+.017818	+.040000	1.03914	1.04753	.499351	+.000
+.002470	+.100003	0.02193	1.02650	.512063	+.142
+.021603	+.040000	1.05142	1.06269	.490292	+.000
+.003877	+.100008	1.02819	1.03412	.507440	+.222
+.025194	+.040000	1.06298	1.07706	.481777	+.000
+.005365	+.100014	1.03429	1.04158	.502935	+.307
+.028674	+.040000	1.07407	1.09096	.473620	+.000
+.006925	+.100024	1.04029	1.04895	.498503	+.397
+.032091	+.040000	1.08483	1.10454	.465723	+.000
+.008548	+.100037	1.04624	1.05628	.494114	+.490
+.035472	+.040000	1.09535	1.11791	.458018	+.000
+.010230	+.100052	1.05216	1.06361	.489746	+.586
+.038838	+.040000	1.10569	1.13115	.450461	+.000
+.011966	+.100072	1.05808	1.07096	.485384	+.686
+.042203	+.040000	1.11590	1.14432	.443017	+.000
+.013753	+.100095	1.06401	1.07836	.481016	+.788
+.045577	+.040000	1.12603	1.15747	.435660	+.000
+.015591	+.100122	1.06997	1.08582	.476631	+.893
+.048968	+.040000	1.13609	1.17062	.428372	+.000
+.017478	+.100153	1.07597	1.09336	.472222	+1.001
+.052385	+.040000	1.14611	1.18384	.421129	+.000
+.019412	+.100188	1.08202	1.10099	.467779	+1.112
+.055833	+.040000	1.15613	1.19714	.413919	+.000
+.021394	+.100229	1.08814	1.10874	.463296	+1.226
+.059319	+.040000	1.16617	1.21055	.406726	+.000

X	R	M STAR	M	P/PO	THETA
+.023423	+.100274	1.09432	1.11661	.458766	+1.342
+.062850	+.040000	1.17623	1.22412	.399536	+.000
+.025501	+.100325	1.10059	1.12462	.454181	+1.461
+.066431	+.040000	1.18636	1.23787	.392338	+.000
+.027628	+.100382	1.10696	1.13278	.449534	+1.583
+.084309	+.040000	1.23833	1.31019	.355937	+.000
+.038224	+.100731	1.14129	1.17747	.424608	+2.189
+.097036	+.040000	1.27466	1.36263	.331117	+.000
+.045832	+.101050	1.16593	1.21024	.406892	+2.624
+.108017	+.040000	1.30545	1.40840	.310543	+.000
+.052389	+.101372	1.18715	1.23895	.391776	+2.999
+.118151	+.040000	1.33333	1.45095	.292325	+.000
+.058413	+.101706	1.20656	1.26563	.378071	+3.343
+.127824	+.040000	1.35941	1.49178	.275661	+.000
+.064124	+.102056	1.22487	1.29117	.365269	+3.669
+.137247	+.040000	1.38427	1.53171	.260130	+.000
+.069641	+.102425	1.24243	1.31604	.353103	+3.984
+.146553	+.040000	1.40829	1.57124	.245481	+.000
+.075036	+.102815	1.25949	1.34053	.341411	+4.291
+.155835	+.040000	1.43170	1.61074	.231553	+.000
+.080358	+.103229	1.27618	1.36486	.330090	+4.594
+.165166	+.040000	1.45467	1.65049	.218236	+.000
+.085642	+.103667	1.29261	1.38916	.319066	+4.895
+.174605	+.040000	1.47732	1.69071	.205449	+.000
+.090915	+.104133	1.30888	1.41356	.308285	+5.195
+.184203	+.040000	1.49976	1.73161	.193139	+.000
+.096199	+.104627	1.32502	1.43815	.297712	+5.495
+.188529	+.040000	1.50970	1.75008	.187802	+.000
+.098551	+.104856	1.33219	1.44918	.293064	+5.628
+.106816	+.105660	1.34364	1.46697	.285691	+5.487
+.112141	+.106167	1.35073	1.47808	.281165	+5.385

X	R	M STAR	M	P/PO	THETA
+.117497	+.106667	1.35763	1.48897	.276783	+5.274
+.122892	+.107159	1.36438	1.49969	.272526	+5.155
+.149558	+.109403	1.39544	1.54996	.253276	+4.464
+.168240	+.110772	1.41493	1.58234	.241495	+3.918
+.184194	+.111796	1.43030	1.60834	.232379	+3.430
+.198787	+.112612	1.44337	1.63081	.224743	+2.972
+.212602	+.113277	1.45493	1.65095	.218085	+2.534
+.225950	+.113818	1.46538	1.66939	.212143	+2.111
+.239020	+.114253	1.47496	1.68647	.206766	+1.701
+.251941	+.114592	1.48381	1.70242	.201856	+1.301
+.264801	+.114840	1.49201	1.71736	.197350	+.911
+.277671	+.115002	1.49964	1.73138	.193205	+.530
+.290598	+.115080	1.50672	1.74451	.189396	+.161
+.296373	+.115088	1.50970	1.75008	.187802	+.000

10 – C RO =0.1 RS =0.03

X	R	M STAR	M	P/PO	THETA
+.016763	+.030000	1.02956	1.03579	.506428	+.000
+.001377	+.100001	1.01652	1.01992	.516064	+.079
+.022088	+.030000	1.04587	1.05583	.494384	+.000
+.002933	+.100004	1.02405	1.02908	.510495	+.168
+.026879	+.030000	1.06058	1.07408	.483539	+.000
+.004617	+.100011	1.03127	1.03789	.505161	+.265
+.031408	+.030000	1.07442	1.09140	.473366	+.000
+.006405	+.100021	1.03832	1.04653	.499954	+.367
+.035793	+.030000	1.08768	1.10815	.463632	+.000
+.008283	+.100034	1.04528	1.05510	.494817	+.475
+.040098	+.030000	1.10055	1.12456	.454212	+.000
+.010242	+.100052	1.05220	1.06366	.489715	+.587
+.044364	+.030000	1.11316	1.14078	.445013	+.000
+.012274	+.100075	1.05912	1.07225	.484620	+.703
+.048616	+.030000	1.12556	1.15685	.436001	+.000
+.014377	+.100103	1.06605	1.08091	.479513	+.824
+.052876	+.030000	1.13783	1.17292	.427109	+.000
+.016548	+.100137	1.07304	1.08966	.474380	+.948
+.057158	+.030000	1.15003	1.18902	.418309	+.000
+.018784	+.100176	1.08008	1.09853	.469207	+1.076
+.061476	+.030000	1.16219	1.20522	.409573	+.000
+.021086	+.100222	1.08720	1.10755	.463981	+1.208
+.065842	+.030000	1.17436	1.22158	.400876	+.000
+.023453	+.100275	1.09443	1.11673	.458693	+1.343
+.070267	+.030000	1.18656	1.23815	.392193	+.000
+.025885	+.100335	1.10176	1.12611	.453329	+1.483
+.074762	+.030000	1.19884	1.25497	.383505	+.000
+.028386	+.100403	1.10923	1.13570	.447878	+1.626
+.079340	+.030000	1.21124	1.27212	.374789	+.000
+.030957	+.100479	1.11685	1.14555	.442328	+1.773

X	R	M STAR	M	P/PO	THETA
+.084013	+.030000	1.22379	1.28965	.366021	+.000
+.033603	+.100565	1.12464	1.15567	.436663	+1.925
+.109702	+.030000	1.29329	1.39017	.318616	+.000
+.048100	+.101157	1.16973	1.21535	.404176	+2.754
+.127389	+.030000	1.33975	1.46091	.288188	+.000
+.058068	+.101686	1.20064	1.25745	.382236	+3.323
+.142682	+.030000	1.37876	1.52277	.263542	+.000
+.066595	+.102217	1.22700	1.29417	.363786	+3.810
+.156906	+.030000	1.41394	1.58068	.242088	+.000
+.074419	+.102769	1.25102	1.32833	.347202	+4.256
+.170627	+.030000	1.44681	1.63677	.222753	+.000
+.081846	+.103349	1.27364	1.36114	.331804	+4.679
+.184159	+.030000	1.47815	1.69221	.204987	+.000
+.089038	+.103964	1.29535	1.39324	.317243	+5.088
+.197708	+.030000	1.50847	1.74777	.188460	+.000
+.096099	+.104617	1.31645	1.42505	.303309	+5.489
+.198266	+.030000	1.50970	1.75007	.187804	+.000
+.096386	+.104645	1.31731	1.42636	.302745	+5,506
+.109931	+.105932	1.33663	1.45605	.290200	+5.352
+.116759	+.106566	1.34571	1.47020	.284371	+5.249
+.123571	+.107185	1.35438	1.48384	.278842	+5.132
+.130395	+.107790	1.36273	1.49706	.273564	+5.003
+.137254	+.108382	1.37080	1.50995	.268503	+4.863
+.144169	+.108961	1.37863	1.52255	.263626	+4.713
+.151165	+.109528	1.38626	1.53493	.258908	+4.553
+.158265	+.110083	1.39372	1.54714	.254326	+4.384
+.196738	+.112688	1.43015	1.60809	.232465	+3.365
+.222741	+.114050	1.45125	1.64451	.220195	+2.632
+.244895	+.114947	1.46725	1.67269	.211092	+2.006
+.265197	+.115559	1.48037	1.69620	.203758	+1.443
+.284468	+.115958	1.49151	1.71645	.197622	+.928

X	R	M STAR	M	P/PO	THETA
+.303126	+.116182	1.50111	1.73411	.192409	+.453
+.321408	+.116257	1.50939	1.74950	.187966	+.018
+.322152	+.116258	1.50970	1.75008	.187802	+.000

10 − D RO = 0.1 RS = 0.025

X	R	M STAR	M	P/PO	THETA
+.018429	+.025000	1.03180	1.03853	.504773	+.000
+.001484	+.100001	1.01708	1.02060	.515652	+.085
+.024379	+.025000	1.04963	1.06048	.491610	+.000
+.003169	+.100005	1.02511	1.03036	.509716	+.182
+.029712	+.025000	1.06568	1.08043	.479792	+.000
+.004996	+.100012	1.03281	1.03976	.504029	+.286
+.034746	+.025000	1.08074	1.09936	.468725	+.000
+.006938	+.100024	1.04033	1.04900	.498470	+.397
+.039620	+.025000	1.09517	1.11768	.458148	+.000
+.008979	+.100040	1.04778	1.05818	.492977	+.514
+.044406	+.025000	1.10918	1.13564	.447916	+.000
+.011111	+.100062	1.05519	1.06737	.487514	+.637
+.049151	+.025000	1.12289	1.15339	.437934	+.000
+.013325	+.100089	1.06261	1.07661	.482047	+.763
+.053887	+.025000	1.13641	1.17105	.428137	+.000
+.015619	+.100122	1.07007	1.08594	.476558	+.895
+.058636	+.025000	1.14980	1.18871	.418476	+.000
+.017989	+.100162	1.07760	1.09540	.471030	+1.031
+.063418	+.025000	1.16312	1.20646	.408910	+.000
+.020435	+.100209	1.08521	1.10502	.465446	+1.171
+.068249	+.025000	1.17642	1.22437	.399402	+.000
+.022955	+.100263	1.09292	1.11482	.459793	+1.315
+.073144	+.025000	1.18976	1.24251	.389928	+.000
+.025551	+.100326	1.10077	1.12483	.454057	+1.464
+.078119	+.025000	1.20317	1.26093	.380458	+.000
+.028225	+.100398	1.10876	1.13510	.448222	+1.617
+.083188	+.025000	1.21671	1.27974	.370960	+.000
+.030980	+.100480	1.11693	1.14564	.442273	+1.774

X	R	M STAR	M	P/PO	THETA
+.088369	+.025000	1.23042	1.29899	.361409	+.000
+.033819	+.100572	1.12529	1.15651	.436194	+1.937
+.093682	+.025000	1.24436	1.31879	.351773	+.000
+.036751	+.100675	1.13389	1.16774	.429961	+2.105
+.124188	+.025000	1.32415	1.43681	.298283	+.000
+.053512	+.101432	1.18520	1.23629	.393157	+3.063
+.144912	+.025000	1.37640	1.51896	.265006	+.000
+.064800	+.102100	1.21963	1.28383	.368917	+3.708
+.162891	+.025000	1.42005	1.59095	.238444	+.000
+.074434	+.102770	1.24884	1.32519	.348699	+4.257
+.179715	+.025000	1.45934	1.65870	.215571	+.000
+.083273	+.103467	1.27541	1.36374	.330605	+4.760
+.196063	+.025000	1.49602	1.72471	.195168	+.000
+.091673	+.104202	1.30043	1.40084	.313869	+5.238
+.202321	+.025000	1.50971	1.75009	.187798	+.000
+.094828	+.104496	1.30980	1.41496	.307674	+5.417
+.107719	+.105707	1.32878	1.44392	.295274	+5.319
+.115493	+.106425	1.33938	1.46034	.288424	+5.225
+.123184	+.107120	1.34935	1.47591	.282044	+5.111
+.130837	+.107796	1.35880	1.49082	.276046	+4.982
+.138489	+.108454	1.36782	1.50519	.270364	+4.839
+.146172	+.109094	1.37650	1.51912	.264947	+4.684
+.153917	+.109717	1.38488	1.53269	.259756	+4.517
+.161751	+.110324	1.39302	1.54598	.254757	+4.340
+.169707	+.110914	1.40095	1.55905	.249922	+4.152
+.177817	+.111489	1.40871	1.57194	.245227	+3.954
+.223556	+.114169	1.44731	1.63765	.222461	+2.754
+.253936	+.115414	1.46859	1.67509	.210333	+1.936
+.279748	+.116135	1.48418	1.70311	.201647	+1.264
+.303358	+.116536	1.49649	1.72558	.194912	+.683
+.325683	+.116703	1.50641	1.74394	.189560	+.177
+.334047	+.116716	1.50970	1.75008	.187802	+.000

TABLE 10
DESIGN MACH NUMBER = 1.75

10 - [illegible] E RO =0.1 RS =.0.02

X	R	M STAR	M	P/PO	THETA
0					
+.020177	+.020000	1.03426	1.04155	.502954	+.000
+.001593	+.100001	1.01763	1.02127	.515242	+.091
+.026785	+.020000	1.05374	1.06557	.488579	+.000
+.003407	+.100006	1.02616	1.03164	.508941	+.195
+.032686	+.020000	-1.07121	1.08736	.475723	+.000
+.005379	+.100014	1.03434	1.04164	.502900	+.308
+.038251	+.020000	1.08757	1.10802	.463710	+.000
+.007477	+.100028	1.04234	1.05148	.496987	+.428
+.043637	+.020000	1.10325	1.12801	.452245	+.000
+.009686	+.100047	1.05027	1.06127	.491137	+.555
+.048930	+.020000	1.11845	1.14762	.441164	+.000
+.011995	+.100072	1.05818	1.07109	.485308	+.687
+.054182	+.020000	1.13334	1.16703	.430357	+.000
+.014396	+.100104	1.06612	1.08099	.479465	+.825
+.059429	+.020000	1.14802	1.18636	.419753	+.000
+.016885	+.100143	1.07411	1.09102	.473587	+.967
+.064698	+.020000	1.16258	1.20575	.409292	+.000
+.019461	+.100189	1.08220	1.10121	.467654	+1.115
+.070014	+.020000	1.17709	1.22528	.398924	+.000
+.022122	+.100245	1.09039	1.11159	.461648	+1.267
+.075395	+.020000	1.19161	1.24503	.388620	+.000
+.024869	+.100309	1.09872	1.12222	.455552	+1.425
+.080861	+.020000	1.20619	1.26511	.378332	+.000
+.027704	+.100384	1.10722	1.13311	.449348	+1.587
+.086432	+.020000	1.22091	1.28561	.368030	+.000

X	R	M STAR	M	P/PO	THETA
+.030630	+.100469	1.11590	1.14432	.443018	+1.754
+.092130	+.020000	1.23581	1.30662	.357676	+.000
+.033653	+.100566	1.12481	1.15588	.436541	+1.927
+.097981	+.020000	1.25097	1.32825	.347237	+.000
+.036780	+.100676	1.13399	1.16787	.429892	+2.106
+.104014	+.020000	1.26646	1.35066	.336663	+.000
+.040021	+.100801	1.14347	1.18034	.423040	+2.292
+.140095	+.020000	1.35771	1.48910	.276732	+.000
+.059287	+.101757	1.20169	1.25889	.381499	+3.393
+.164340	+.020000	1.41631	1.58466	.240670	+.000
+.072008	+.102593	1.23992	1.31245	.354837	+4.119
+.185476	+.020000	1.46500	1.66870	.212362	+.000
+.082839	+.103431	1.27220	1.35903	.332775	+4.736
+.205403	+.020000	1.50872	1.74824	.188327	+.000
+.092781	+.104304	1.30153	1.40249	.313142	+5.301
+.205860	+.020000	1.50969	1.75005	.187809	+.000
+.093005	+.104325	1.30219	1.40348	.312702	+5.314
+.111212	+.106003	1.32943	1.44493	.294848	+5.218
+.120006	+.106798	1.34127	1.46327	.287215	+5.117
+.128654	+.107563	1.35224	1.48046	.280202	+4.994
+.137225	+.108302	1.36255	1.49677	.273680	+4.851
+.145770	+.109015	1.37231	1.51238	.267556	+4.693
+.154333	+.109705	1.38163	1.52742	.261763	+4.522
+.162954	+.110373	1.39059	1.54200	.256247	+4.337
+.171669	+.111019	1.39923	1.55621	.250965	+4.142
+.180519	+.111644	1.40763	1.57013	.245883	+3.935
+.189547	+.112247	1.41581	1.58382	.240969	+3.717
+.198801	+.112830	1.42383	1.59735	.236195	+3.489
+.252850	+.115472	1.46401	1.66695	.212920	+2.108
+.288076	+.116498	1.48477	1.70416	.201325	+1.230
+.317798	+.116960	1.49910	1.73039	.193496	+.551
+.344705	+.117092	1.50950	1.74970	.187908	+.011
+.345307	+.117092	1.50970	1.75008	.187802	+.000

TABLE 11
DESIGN MACH NUMBER = 2.0

11 - A RO =0.1 RS =0.05

X	R	M STAR	M	P/PO	THETA
+.010795	+.050000	1.02211	1.02671	.511935	+.000
+.000958	+.100000	1.01427	1.01719	.517731	+.055
+.013931	+.050000	1.03318	1.04022	.503753	+.000
+.002020	+.100002	1.01979	1.02389	.513650	+.116
+.016812	+.050000	1.04324	1.05258	.496324	+.000
+.003159	+.100005	1.02507	1.03032	.509742	+.181
+.019557	+.050000	1.05273	1.06431	.489329	+.000
+.004360	+.100010	1.03022	1.03660	.505940	+.250
+.022223	+.050000	1.06182	1.07562	.482628	+.000
+.005615	+.100016	1.03527	1.04278	.502209	+.322
+.024841	+.050000	1.07064	1.08665	.476139	+.000
+.006918	+.100024	1.04026	1.04891	.498523	+.396
+.027432	+.050000	1.07925	1.09749	.469812	+.000
+.008265	+.100034	1.04522	1.05502	.494866	+.474
+.030009	+.050000	1.08771	1.10819	.463612	+.000
+.009653	+.100047	1.05015	1.06112	.491227	+.553
+.032580	+.050000	1.09604	1.11879	.457511	+.000
+.011079	+.100061	1.05508	1.06723	.487595	+.635
+.035154	+.050000	1.10428	1.12934	.451491	+.000
+.012542	+.100079	1.06001	1.07336	.483963	+.719
+.037736	+.050000	1.11245	1.13985	.445535	+.000
+.014041	+.100099	1.06495	1.07953	.480325	+.804

X	R	M STAR	M	P/PO	THETA
+.040330	+.050000	1.12056	1.15036	.439628	+.000
+.015574	+.100121	1.06991	1.08574	.476674	+.892
+.042940	+.050000	1.12864	1.16088	.433762	+.000
+.017141	+.100147	1.07491	1.09201	.473006	+.982
+.045570	+.050000	1.13670	1.17144	.427925	+.000
+.018741	+.100176	1.07993	1.09834	.469316	+1.074
+.048223	+.050000	1.14476	1.18204	.422108	+.000
+.020374	+.100208	1.08500	1.10475	.465600	+1.167
+.050902	+.050000	1.15282	1.19272	.416304	+.000
+.022040	+.100243	1.09011	1.11124	.461854	+1.263
+.062872	+.050000	1.19061	1.24367	.389326	+.000
+.029451	+.100434	1.11557	1.14389	.443260	+1.687
+.071754	+.050000	1.21836	1.28205	.369805	+.000
+.035032	+.100614	1.13475	1.16888	.429335	+2.006
+.079453	+.050000	1.24218	1.31567	.353280	+.000
+.039896	+.100796	1.15148	1.19095	.417265	+2.285
+.086536	+.050000	1.26383	1.34683	.338455	+.000
+.044379	+.100985	1.16685	1.21148	.406234	+2.541
+.093256	+.050000	1.28411	1.37655	.324752	+.000
+.048631	+.101183	1.18138	1.23109	.395876	+2.784
+.099751	+.050000	1.30345	1.40539	.311865	+.000
+.052734	+.101390	1.19532	1.25012	.385997	+3.019
+.106108	+.050000	1.32212	1.43370	.299606	+.000
+.056736	+.101610	1.20884	1.26878	.376474	+3.247
+.112386	+.050000	1.34027	1.46172	.287851	+.000
+.060674	+.101841	1.22205	1.28722	.367229	+3.472
+.118627	+.050000	1.35805	1.48963	.276518	+.000
+.064569	+.102085	1.23504	1.30553	.358207	+3.694
+.124866	+.050000	1.37554	1.51757	.265543	+.000
+.068440	+.102342	1.24786	1.32380	.349368	+3.915

X	R	M STAR	M	P/PO	THETA
+.131129	+.050000	1.39281	1.54565	.254882	+.000
+.072301	+.102614	1.26056	1.34208	.340681	+4.135
+.137442	+.050000	1.40993	1.57396	.244498	+.000
+.076165	+.102901	1.27317	1.36045	.332121	+4.356
+.143824	+.050000	1.42692	1.60260	.234367	+.000
+.080039	+.103203	1.28572	1.37893	.323671	+4.576
+.150295	+.050000	1.44385	1.63164	.224465	+.000
+.083932	+.103522	1.29825	1.39758	.315314	+4.798
+.156874	+.050000	1.46074	1.66116	.214775	+.000
+.087854	+.103859	1.31077	1.41643	.307037	+5.021
+.163582	+.050000	1.47762	1.69125	.205283	+.000
+.091810	+.104215	1.32331	1.43552	.298829	+5.246
+.195044	+.050000	1.55323	1.83368	.165286	+.000
+.109677	+.106014	1.37979	1.52444	.262901	+6.259
+.220019	+.050000	1.60822	1.94635	.138908	+.000
+.123066	+.107573	1.42097	1.59251	.237893	+7.016
+.231937	+.050000	1.63299	1.99999	.127807	+.000
+.129190	+.108345	1.43954	1.62419	.226969	+7.361
+.145544	+.110393	1.46118	1.66195	.214521	+6.913
+.155709	+.111598	1.47380	1.68439	.207415	+6.609
+.165503	+.112706	1.48536	1.70523	.201000	+6.303
+.175061	+.113736	1.49613	1.72491	.195110	+5.995
+.184478	+.114699	1.50627	1.74367	.189638	+5.684
+.193817	+.115603	1.51589	1.76170	.184513	+5.371
+.203129	+.116452	1.52509	1.77912	.179680	+5.055
+.212457	+.117251	1.53392	1.79603	.175100	+4.735
+.221836	+.118001	1.54243	1.81251	.170740	+4.413
+.231293	+.118704	1.55065	1.82861	.166578	+4.088
+.240857	+.119360	1.55862	1.84438	.162594	+3.760
+.250553	+.119970	1.56636	1.85985	.158771	+3.429
+.260407	+.120531	1.57389	1.87505	.155097	+3.095
+.306217	+.122402	1.60492	1.93935	.140424	+1.581
+.341855	+.123044	1.62483	1.98211	.131408	+.485
+.358577	+.123115	1.63300	2.00002	.127802	+.000

11 – B RO =0.1 RS =0.04

X	R	M STAR	M	P/PO	THETA
+.013648	+.040000	1.02558	1.03094	.509366	+.000
+.001165	+.100001	1.01540	1.01857	.516891	+.067
+.017818	+.040000	1.03914	1.04753	.499351	+.000
+.002470	+.100003	1.02193	1.02650	.512063	+.142
+.021603	+.040000	1.05142	1.06269	.490292	+.000
+.003877	+.100008	1.02819	1.03412	.507440	+.222
+.025194	+.040000	1.06298	1.07706	.481777	+.000
+.005365	+.100014	1.03429	1.04158	.502935	+.307
+.028674	+.040000	1.07407	1.09096	.473620	+.000
+.006925	+.100024	1.04029	1.04895	.498503	+.397
+.032091	+.040000	1.08483	1.10454	.465723	+.000
+.008548	+.100037	1.04624	1.05628	.494114	+.490
+.035472	+.040000	1.09535	1.11791	.458018	+.000
+.010230	+.100052	1.05216	1.06361	.489746	+.586
+.038838	+.040000	1.10569	1.13115	.450461	+.000
+.011966	+.100072	1.05808	1.07096	.485384	+.686
+.042203	+.040000	1.11590	1.14432	.443017	+.000
+.013753	+.100095	1.06401	1.07836	.481016	+.788
+.045577	+.040000	1.12603	1.15747	.435660	+.000
+.015591	+.100122	1.06997	1.08582	.476631	+.893
+.048968	+.040000	1.13609	1.17062	.428372	+.000
+.017478	+.100153	1.07597	1.09336	.472222	+1.001
+.052385	+.040000	1.14611	1.18384	.421129	+.000
+.019412	+.100188	1.08202	1.10099	.467779	+1.112
+.055833	+.040000	1.15613	1.19714	.413919	+.000
+.021394	+.100229	1.08814	1.10874	.463296	+1.226
+.059319	+.040000	1.16617	1.21055	.406726	+.000
+.023423	+.100274	1.09432	1.11661	.458766	+1.342
+.062850	+.040000	1.17623	1.22412	.399536	+.000
+.025501	+.100325	1.10059	1.12462	.454181	+1.461
+.066431	+.040000	1.18636	1.23787	.392338	+.000
+.027628	+.100382	1.10696	1.13278	.449534	+1.583
+.084309	+.040000	1.23833	1.31019	.355937	+.000

X	R	M STAR	M	P/PO	THETA
+.117787	+.106937	1.38946	1.54017	.256935	+6.718
+.236345	+.040000	1.61129	1.95290	.137506	+.000
+.123376	+.107611	1.40574	1.56698	.247024	+7.033
+.247374	+.040000	1.63300	2.00002	.127801	+.000
+.128731	+.108286	1.42158	1.59354	.237531	+7.335
+.171176	+.113390	1.47490	1.68636	.206800	+6.377
+.188159	+.115217	1.49329	1.71970	.196653	+5.910
+.203765	+.116771	1.50896	1.74869	.188197	+5.458
+.218606	+.118131	1.52286	1.77488	.180845	+5.016
+.233011	+.119340	1.53550	1.79908	.174286	+4.580
+.247184	+.120422	1.54717	1.82177	.168334	+4.148
+.261265	+.121390	1.55806	1.84327	.162872	+3.718
+.275357	+.122253	1.56831	1.86376	.157818	+3.291
+.289543	+.123016	1.57800	1.88340	.153114	+2.867
+.303888	+.123681	1.58718	1.90226	.148721	+2.444
+.318455	+.124249	1.59591	1.92040	.144606	+2.023
+.333296	+.124719	1.60421	1.93786	.140750	+1.605
+.348460	+.125089	1.61210	1.95463	.137138	+1.191
+.364001	+.125357	1.61957	1.97070	.133758	+.782
+.379961	+.125519	1.62663	1.98604	.130610	+.379
+.395588	+.125571	1.63300	2.00002	.127802	+.000

X	R	M STAR	M	P/PO	THETA
+.038224	+.100731	1.14129	1.17747	.424608	+2.189
+.097036	+.040000	1.27466	1.36263	.331117	+.000
+.045832	+.101050	1.16593	1.21024	.406892	+2.624
+.108017	+.040000	1.30545	1.40840	.310543	+.000
+.052389	+.101372	1.18715	1.23895	.391776	+2.999
+.118151	+.040000	1.33333	1.45095	.292325	+.000
+.058413	+.101706	1.20656	1.26563	.378071	+3.343
+.127824	+.040000	1.35941	1.49178	.275661	+.000
+.064124	+.102056	1.22487	1.29117	.365269	+3.669
+.137247	+.040000	1.38427	1.53171	.260130	+.000
+.069641	+.102425	1.24243	1.31604	.353103	+3.984
+.146553	+.040000	1.40829	1.57124	.245481	+.000
+.075036	+.102815	1.25949	1.34053	.341411	+4.291
+.155835	+.040000	1.43170	1.61074	.231553	+.000
+.080358	+.103229	1.27618	1.36486	.330090	+4.594
+.165166	+.040000	1.45467	1.65049	.218236	+.000
+.085642	+.103667	1.29261	1.38916	.319066	+4.895
+.174605	+.040000	1.47732	1.69071	.205449	+.000
+.090915	+.104133	1.30888	1.41356	.308285	+5.195
+.184203	+.040000	1.49976	1.73161	.193139	+.000
+.096199	+.104627	1.32502	1.43815	.297712	+5.495
+.194011	+.040000	1.52207	1.77338	.181260	+.000
+.101512	+.105152	1.34111	1.46303	.287312	+5.796
+.204077	+.040000	1.54432	1.81619	.169779	+.000
+.106871	+.105711	1.35719	1.48827	.277062	+6.100
+.214450	+.040000	1.56656	1.86025	.158674	+.000
+.112290	+.106304	1.37329	1.51396	.266943	+6.407
+.225188	+.040000	1.58887	1.90575	.147921	+.000

11 – C RO =0.1 RS =0.03

X	R	M STAR	M	P/PO	THETA
+.016763	+.030000	1.02956	1.03579	.506428	+.000
+.001377	+.100001	1.01652	1.01992	.516064	+.079
+.022088	+.030000	1.04587	1.05583	.494384	+.000
+.002933	+.100004	1.02405	1.02908	.510495	+.168
+.026879	+.030000	1.06058	1.07408	.483539	+.000
+.004617	+.100011	1.03127	1.03789	.505161	+.265
+.031408	+.030000	1.07442	1.09140	.473366	+.000
+.006405	+.100021	1.03832	1.04653	.499954	+.367
+.035793	+.030000	1.08768	1.10815	.463632	+.000
+.008283	+.100034	1.04528	1.05510	.494817	+.475
+.040098	+.030000	1.10055	1.12456	.454212	+.000
+.010242	+.100052	1.05220	1.06366	.489715	+.587
+.044364	+.030000	1.11316	1.14078	.445013	+.000
+.012274	+.100075	1.05912	1.07225	.484620	+.703
+.048616	+.030000	1.12556	1.15685	.436001	+.000
+.014377	+.100103	1.06605	1.08091	.479513	+.824
+.052876	+.030000	1.13783	1.17292	.427109	+.000
+.016548	+.100137	1.07304	1.08966	.474380	+.948
+.057158	+.030000	1.15003	1.18902	.418309	+.000
+.018784	+.100176	1.08008	1.09853	.469207	+1.076
+.061476	+.030000	1.16219	1.20522	.409573	+.000
+.021086	+.100222	1.08720	1.10755	.463981	+1.208
+.065842	+.030000	1.17436	1.22158	.400876	+.000
+.023453	+.100275	1.09443	1.11673	.458693	+1.343
+.070267	+.030000	1.18656	1.23815	.392193	+.000
+.025885	+.100335	1.10176	1.12611	.453329	+1.483
+.074762	+.030000	1.19884	1.25497	.383505	+.000

X	R	M STAR	M	P/PO	THETA
+.028386	+.100403	1.10923	1.13570	.447878	+1.626
+.079340	+.030000	1.21124	1.27212	.374789	+.000
+.030957	+.100479	1.11685	1.14555	.442328	+1.773
+.084013	+.030000	1.22379	1.28965	.366021	+.000
+.033603	+.100565	1.12464	1.15567	.436663	+1.925
+.109702	+.030000	1.29329	1.39017	.318616	+.000
+.048100	+.101157	1.16973	1.21535	.404176	+2.754
+.127389	+.030000	1.33975	1.46091	.288188	+.000
+.058068	+.101686	1.20064	1.25745	.382236	+3.323
+.142682	+.030000	1.37876	1.52277	.263542	+.000
+.066595	+.102217	1.22700	1.29417	.363786	+3.810
+.156906	+.030000	1.41394	1.58068	.242088	+.000
+.074419	+.102769	1.25102	1.32833	.347202	+4.256
+.170627	+.030000	1.44681	1.63677	.222753	+.000
+.081846	+.103349	1.27364	1.36114	.331804	+4.679
+.184159	+.030000	1.47815	1.69221	.204987	+.000
+.089038	+.103964	1.29535	1.39324	.317243	+5.088
+.197708	+.030000	1.50847	1.74777	.188460	+.000
+.096099	+.104617	1.31645	1.42505	.303309	+5.489
+.211422	+.030000	1.53804	1.80399	.172980	+.000
+.103091	+.105314	1.33713	1.45683	.289877	+5.886
+.225441	+.030000	1.56713	1.86140	.158394	+.000
+.110070	+.106058	1.35754	1.48882	.276844	+6.281
+.239878	+.030000	1.59591	1.92039	.144609	+.000
+.117075	+.106853	1.37779	1.52119	.264147	+6.678
+.254851	+.030000	1.62449	1.98137	.131560	+.000
+.124139	+.107705	1.39796	1.55411	.251740	+7.076
+.259428	+.030000	1.63300	2.00001	.127802	+.000
+.126254	+.107970	1.40397	1.56405	.248090	+7.196
+.138471	+.109497	1.42134	1.59314	.237673	+7.052
+.145739	+.110389	1.43104	1.60961	.231941	+6.943

X	R	M STAR	M	P/PO	THETA
+.153106	+.111278	1.44045	1.62576	.226439	+6.818
+.160599	+.112164	1.44962	1.64166	.221134	+6.678
+.201461	+.116611	1.49399	1.72098	.196272	+5.744
+.229361	+.119237	1.51975	1.76899	.182476	+5.010
+.253330	+.121200	1.53946	1.80674	.172254	+4.353
+.275481	+.122768	1.55594	1.83905	.163930	+3.742
+.296699	+.124047	1.57029	1.86776	.156848	+3.160
+.317456	+.125092	1.58308	1.89381	.150672	+2.602
+.338046	+.125930	1.59463	1.91772	.145207	+2.064
+.358652	+.126580	1.60510	1.93974	.140341	+1.546
+.379430	+.127050	1.61461	1.96002	.135995	+1.048
+.400474	+.127348	1.62321	1.97859	.132131	+.574
+.421846	+.127479	1.63089	1.99537	.128728	+.127
+.428280	+.127486	1.63300	2.00002	.127802	+.000

11 – D RO =0.1 RS =0.025

X	R	M STAR	M	P/PO	THETA
+.018429	+.025000	1.03180	1.03853	.504773	+.000
+.001484	+.100001	1.01708	1.02060	.515652	+.085
+.024379	+.025000	1.04963	1.06048	.491610	+.000
+.003169	+.100005	1.02511	1.03036	.509716	+.182
+.029712	+.025000	1.06568	1.08043	.479792	+.000
+.004996	+.100012	1.03281	1.03976	.504029	+.286
+.034746	+.025000	1.08074	1.09936	.468725	+.000
+.006938	+.100024	1.04033	1.04900	.498470	+.397
+.039620	+.025000	1.09517	1.11768	.458148	+.000
+.008979	+.100040	1.04778	1.05818	.492977	+.514
+.044406	+.025000	1.10918	1.13564	.447916	+.000
+.011111	+.100062	1.05519	1.06737	.487514	+.637
+.049151	+.025000	1.12289	1.15339	.437934	+.000
+.013325	+.100089	1.06261	1.07661	.482047	+.763
+.053887	+.025000	1.13641	1.17105	.428137	+.000
+.015619	+.100122	1.07007	1.08594	.476558	+.895
+.058636	+.025000	1.14980	1.18871	.418476	+.000
+.017989	+.100162	1.07760	1.09540	.471030	+1.031
+.063418	+.025000	1.16312	1.20646	.408910	+.000
+.020435	+.100209	1.08521	1.10502	.465446	+1.171
+.068249	+.025000	1.17642	1.22437	.399402	+.000
+.022955	+.100263	1.09292	1.11482	.459793	+1.315
+.073144	+.025000	1.18976	1.24251	.389928	+.000
+.025551	+.100326	1.10077	1.12483	.454057	+1.464
+.078119	+.025000	1.20317	1.26093	.380458	+.000
+.028225	+.100398	1.10876	1.13510	.448222	+1.617
+.083188	+.025000	1.21671	1.27974	.370960	+.000

X	R	M STAR	M	P/PO	THETA
+.030980	+.100480	1.11693	1.14564	.442273	+1.774
+.088369	+.025000	1.23042	1.29899	.361409	+.000
+.033819	+.100572	1.12529	1.15651	.436194	+1.937
+.093682	+.025000	1.24436	1.31879	.351773	+.000
+.036751	+.100675	1.13389	1.16774	.429961	+2.105
+.124188	+.025000	1.32415	1.43681	.298283	+.000
+.053512	+.101432	1.18520	1.23629	.393157	+3.063
+.144912	+.025000	1.37640	1.51896	.265006	+.000
+.064800	+.102100	1.21963	1.28383	.368917	+3.708
+.162891	+.025000	1.42005	1.59095	.238444	+.000
+.074434	+.102770	1.24884	1.32519	.348699	+4.257
+.179715	+.025000	1.45934	1.65870	.215571	+.000
+.083273	+.103467	1.27541	1.36374	.330605	+4.760
+.196063	+.025000	1.49602	1.72471	.195168	+.000
+.091673	+.104202	1.30043	1.40084	.313869	+5.238
+.212317	+.025000	1.53099	1.79040	.176613	+.000
+.099822	+.104982	1.32443	1.43725	.298096	+5.701
+.228740	+.025000	1.56481	1.85673	.159534	+.000
+.107840	+.105815	1.34778	1.47344	.283047	+6.155
+.245539	+.025000	1.59785	1.92445	.143702	+.000
+.115806	+.106706	1.37068	1.50976	.268574	+6.606
+.262897	+.025000	1.63036	1.99420	.128963	+.000
+.123780	+.107661	1.39331	1.54647	.254576	+7.056
+.264342	+.025000	1.63300	2.00001	.127802	+.000
+.124431	+.107742	1.39516	1.54950	.253449	+7.093
+.139795	+.109635	1.41752	1.58670	.239946	+6.958
+.147864	+.110612	1.42835	1.60503	.233524	+6.853

X	R	M STAR	M	P/PO	THETA
+.156016	+.111583	1.43875	1.62284	.227426	+6.728
+.164283	+.112548	1.44880	1.64024	.221602	+6.585
+.172697	+.113507	1.45857	1.65734	.216009	+6.426
+.181294	+.114462	1.46811	1.67422	.210609	+6.251
+.230173	+.119315	1.51544	1.76085	.184750	+5.089
+.263073	+.121996	1.54196	1.81159	.170980	+4.229
+.291359	+.123902	1.56188	1.85087	.160979	+3.479
+.317572	+.125339	1.57828	1.88398	.152977	+2.797
+.342751	+.126429	1.59230	1.91286	.146303	+2.163
+.367437	+.127233	1.60450	1.93846	.140619	+1.569
+.391953	+.127786	1.61518	1.96123	.135741	+1.014
+.416485	+.128110	1.62447	1.98132	.131570	+.501
+.441122	+.128226	1.63243	1.99875	.128053	+.037
+.443138	+.128227	1.63300	2.00002	.127802	+.000

11 - E RO =0.1 RS =0.02

X	R	M STAR	M	P/PO	THETA
+.020177	+.020000	1.03426	1.04155	.502954	+.000
+.001593	+.100001	1.01763	1.02127	.515242	+.091
+.026785	+.020000	1.05374	1.06557	.488579	+.000
+.003407	+.100006	1.02616	1.03164	.508941	+.195
+.032686	+.020000	1.07121	1.08736	.475723	+.000
+.005379	+.100014	1.03434	1.04164	.502900	+.308
+.038251	+.020000	1.08757	1.10802	.463710	+.000
+.007477	+.100028	1.04234	1.05148	.496987	+.428
+.043637	+.020000	1.10325	1.12801	.452245	+.000
+.009686	+.100047	1.05027	1.06127	.491137	+.555
+.048930	+.020000	1.11845	1.14762	.441164	+.000
+.011995	+.100072	1.05818	1.07109	.485308	+.687
+.054182	+.020000	1.13334	1.16703	.430357	+.000
+.014396	+.100104	1.06612	1.08099	.479465	+.825
+.059429	+.020000	1.14802	1.18636	.419753	+.000
+.016885	+.100143	1.07411	1.09102	.473587	+.967
+.064698	+.020000	1.16258	1.20575	.409292	+.000
+.019461	+.100189	1.08220	1.10121	.467654	+1.115
+.070014	+.020000	1.17709	1.22528	.398924	+.000
+.022122	+.100245	1.09039	1.11159	.461648	+1.267
+.075395	+.020000	1.19161	1.24503	.388620	+.000
+.024869	+.100309	1.09872	1.12222	.455552	+1.425
+.080861	+.020000	1.20619	1.26511	.378332	+.000
+.027704	+.100384	1.10722	1.13311	.449348	+1.587
+.086432	+.020000	1.22091	1.28561	.368030	+.000
+.030630	+.100469	1.11590	1.14432	.443018	+1.754
+.092130	+.020000	1.23581	1.30662	.357676	+.000

X	R	M STAR	M	P/PO	THETA
+.033653	+.100566	1.12481	1.15588	.436541	+1.927
+.097981	+.020000	1.25097	1.32825	.347237	+.000
+.036780	+.100676	1.13399	1.16787	.429892	+2.106
+.104014	+.020000	1.26646	1.35066	.336663	+.000
+.040021	+.100801	1.14347	1.18034	.423040	+2.292
+.140095	+.020000	1.35771	1.48910	.276732	+.000
+.059287	+.101757	1.20169	1.25889	.381499	+3.393
+.164340	+.020000	1.41631	1.58466	.240670	+.000
+.072008	+.102593	1.23992	1.31245	.354837	+4.119
+.185476	+.020000	1.46500	1.66870	.212362	+.000
+.082839	+.103431	1.27220	1.35903	.332775	+4.736
+.205403	+.020000	1.50872	1.74824	.188327	+.000
+.092781	+.104304	1.30153	1.40249	.313142	+5.301
+.224940	+.020000	1.54948	1.82630	.167171	+.000
+.102244	+.105227	1.32911	1.44443	.295059	+5.838
+.244561	+.020000	1.58832	1.90461	.148181	+.000
+.111448	+.106210	1.35558	1.48573	.278081	+6.359
+.264608	+.020000	1.62588	1.98439	.130944	+.000
+.120527	+.107263	1.38134	1.52695	.261943	+6.873
+.268531	+.020000	1.63300	2.00003	.127800	+.000
+.122262	+.107474	1.38624	1.53491	.258917	+6.970
+.138508	+.109448	1.41076	1.57536	.243994	+6.887
+.147472	+.110523	1.42307	1.59606	.236647	+6.793
+.156477	+.111587	1.43473	1.61592	.229778	+6.673
+.165567	+.112639	1.44586	1.63513	.223301	+6.531
+.174782	+.113681	1.45657	1.65382	.217150	+6.370
+.184163	+.114713	1.46693	1.67213	.211271	+6.189
+.193758	+.115737	1.47702	1.69017	.205618	+5.992
+.203621	+.116753	1.48690	1.70804	.200149	+5.777
+.261833	+.121920	1.53687	1.80172	.173583	+4.368
+.300488	+.124539	1.56372	1.85454	.160073	+3.383
+.333724	+.126262	1.58340	1.89445	.150523	+2.555
+.364547	+.127441	1.59914	1.92717	.143100	+1.824
+.394147	+.128215	1.61212	1.95468	.137126	+1.171
+.423088	+.128660	1.62286	1.97783	.132286	+.590
+.451602	+.128828	1.63156	1.99684	.128434	+.087
+.457036	+.128832	1.63300	2.00002	.127802	+.000

TABLE 12
DESIGN MACH NUMBER = 2.25

12 – A RO =0.1 RS =0.05

X	R	M STAR	M	P/PO	THETA
+.010795	+.050000	1.00001	1.02671	.511935	+.000
+.000958	+.100000	1.01427	1.01719	.517731	+.055
+.013931	+.050000	1.03318	1.04022	.503753	+.000
+.002020	+.100002	1.01979	1.02389	.513650	+.116
+.016812	+.050000	1.04324	1.05258	.496324	+.000
+.003159	+.100005	1.02507	1.03032	.509742	+.181
+.019557	+.050000	1.05273	1.06431	.489329	+.000
+.004360	+.100010	1.03022	1.03660	.505940	+.250
+.022223	+.050000	1.06182	1.07562	.482628	+.000
+.005615	+.100016	1.03527	1.04278	.502209	+.322
+.024841	+.050000	1.07064	1.08665	.476139	+.000
+.006918	+.100024	1.04026	1.04891	.498523	+.396
+.027432	+.050000	1.07925	1.09749	.469812	+.000
+.008265	+.100034	1.04522	1.05502	.494866	+.474
+.030009	+.050000	1.08771	1.10819	.463612	+.000
+.009653	+.100047	1.05015	1.06112	.491227	+.553
+.032580	+.050000	1.09604	1.11879	.457511	+.000
+.011079	+.100061	1.05508	1.06723	.487595	+.635
+.035154	+.050000	1.10428	1.12934	.451491	+.000
+.012542	+.100079	1.06001	1.07336	.483963	+.719
+.037736	+.050000	1.11245	1.13985	.445535	+.000
+.014041	+.100099	1.06495	1.07953	.480325	+.804

X	R	M STAR	M	P/PO	THETA
+.040330	+.050000	1.12056	1.15036	.439628	+.000
+.015574	+.100121	1.06991	1.08574	.476674	+.892
+.042940	+.050000	1.12864	1.16088	.433762	+.000
+.017141	+.100147	1.07491	1.09201	.473006	+.982
+.045570	+.050000	1.13670	1.17144	.427925	+.000
+.018741	+.100176	1.07993	1.09834	.469316	+1.074
+.048223	+.050000	1.14476	1.18204	.422108	+.000
+.020374	+.100208	1.08500	1.10475	.465600	+1.167
+.050902	+.050000	1.15282	1.19272	.416304	+.000
+.022040	+.100243	1.09011	1.11124	.461854	+1.263
+.062872	+.050000	1.19061	1.24367	.389326	+.000
+.029451	+.100434	1.11557	1.14389	.443260	+1.687
+.071754	+.050000	1.21836	1.28205	.369805	+.000
+.035032	+.100614	1.13475	1.16888	.429335	+2.006
+.079453	+.050000	1.24218	1.31567	.353280	+.000
+.039896	+.100796	1.15148	1.19095	.417265	+2.285
+.086536	+.050000	1.26383	1.34683	.338455	+.000
+.044379	+.100985	1.16685	1.21148	.406234	+2.541
+.093256	+.050000	1.28411	1.37655	.324752	+.000
+.048631	+.101183	1.18138	1.23109	.395876	+2.784
+.099751	+.050000	1.30345	1.40539	.311865	+.000
+.052734	+.101390	1.19532	1.25012	.385997	+3.019
+.106108	+.050000	1.32212	1.43370	.299606	+.000
+.056736	+.101610	1.20884	1.26878	.376474	+3.247
+.112386	+.050000	1.34027	1.46172	.287851	+.000
+.060674	+.101841	1.22205	1.28722	.367229	+3.472
+.118627	+.050000	1.35805	1.48963	.276518	+.000
+.064569	+.102085	1.23504	1.30553	.358207	+3.694
+.124866	+.050000	1.37554	1.51757	.265543	+.000

X	R	M STAR	M	P/PO	THETA
+.068440	+.102342	1.24786	1.32380	.349368	+3.915
+.131129	+.050000	1.39281	1.54565	.254882	+.000
+.072301	+.102614	1.26056	1.34208	.340681	+4.135
+.137442	+.050000	1.40993	1.57396	.244498	+.000
+.076165	+.102901	1.27317	1.36045	.332121	+4.356
+.143824	+.050000	1.42692	1.60260	.234367	+.000
+.080039	+.103203	1.28572	1.37893	.323671	+4.576
+.150295	+.050000	1.44385	1.63164	.224465	+.000
+.083932	+.103522	1.29825	1.39758	.315314	+4.798
+.156874	+.050000	1.46074	1.66116	.214775	+.000
+.087854	+.103859	1.31077	1.41643	.307037	+5.021
+.163582	+.050000	1.47762	1.69125	.205283	+.000
+.091810	+.104215	1.32331	1.43552	.298829	+5.246
+.195044	+.050000	1.55323	1.83368	.165286	+.000
+.109677	+.106014	1.37979	1.52444	.262901	+6.259
+.220019	+.050000	1.60822	1.94635	.138908	+.000
+.123066	+.107573	1.42097	1.59251	.237893	+7.016
+.243132	+.050000	1.65524	2.04986	.118256	+.000
+.134813	+.109087	1.45621	1.65319	.217355	+7.678
+.265856	+.050000	1.69798	2.15061	.101036	+.000
+.145762	+.110623	1.48824	1.71048	.199414	+8.293
+.288533	+.050000	1.73740	2.24994	.086490	+.000
+.156101	+.112184	1.51776	1.76522	.183525	+8.872
+.166545	+.113788	1.53129	1.79098	.176456	+8.595
+.176574	+.115279	1.54361	1.81481	.170140	+8.313
+.186477	+.116700	1.55517	1.83753	.164314	+8.024
+.196323	+.118062	1.56612	1.85936	.158890	+7.727
+.206164	+.119371	1.57657	1.88048	.153803	+7.423
+.216045	+.120631	1.58658	1.90102	.149005	+7.114

X	R	M STAR	M	P/PO	THETA
+.226005	+.121846	1.59623	1.92107	.144457	+6.798
+.236071	+.123018	1.60556	1.94070	.140130	+6.476
+.246277	+.124147	1.61460	1.96000	.136000	+6.148
+.256650	+.125234	1.62340	1.97900	.132047	+5.815
+.267220	+.126278	1.63197	1.99775	.128253	+5.476
+.316750	+.130344	1.66763	2.07838	.113109	+3.908
+.355786	+.132608	1.69106	2.13382	.103723	+2.732
+.391500	+.133997	1.70943	2.17878	.096679	+1.722
+.426068	+.134762	1.72469	2.21718	.091040	+.814
+.459855	+.135002	1.73740	2.24994	.086489	+.000

12 – B RO =0.1 RS =0.04

X	R	M STAR	M	P/PO	THETA
+.013648	+.040000	1.02558	1.03094	.509366	+.000
+.001165	+.100001	1.01540	1.01857	.516891	+.067
+.017818	+.040000	1.03914	1.04753	.499351	+.000
+.002470	+.100003	1.02193	1.02650	.512063	+.142
+.021603	+.040000	1.05142	1.06269	.490292	+.000
+.003877	+.100008	1.02819	1.03412	.507440	+.222
+.025194	+.040000	1.06298	1.07706	.481777	+.000
+.005365	+.100014	1.03429	1.04158	.502935	+.307
+.028674	+.040000	1.07407	1.09096	.473620	+.000
+.006925	+.100024	1.04029	1.04895	.498503	+.397
+.032091	+.040000	1.08483	1.10454	.465723	+.000
+.008548	+.100037	1.04624	1.05628	.494114	+.490
+.035472	+.040000	1.09535	1.11791	.458018	+.000
+.010230	+.100052	1.05216	1.06361	.489746	+.586
+.038838	+.040000	1.10569	1.13115	.450461	+.000
+.011966	+.100072	1.05808	1.07096	.485384	+.686
+.042203	+.040000	1.11590	1.14432	.443017	+.000
+.013753	+.100095	1.06401	1.07836	.481016	+.788
+.045577	+.040000	1.12603	1.15747	.435660	+.000
+.015591	+.100122	1.06997	1.08582	.476631	+.893
+.048968	+.040000	1.13609	1.17062	.428372	+.000
+.017478	+.100153	1.07597	1.09336	.472222	+1.001
+.052385	+.040000	1.14611	1.18384	.421129	+.000
+.019412	+.100188	1.08202	1.10099	.467779	+1.112
+.055833	+.040000	1.15613	1.19714	.413919	+.000

X	R	M STAR	M	P/PO	THETA
+.021394	+.100229	1.08814	1.10874	.463296	+1.226
+.059319	+.040000	1.16617	1.21055	.406726	+.000
+.023423	+.100274	1.09432	1.11661	.458766	+1.342
+.062850	+.040000	1.17623	1.22412	.399536	+.000
+.025501	+.100325	1.10059	1.12462	.454181	+1.461
+.066431	+.040000	1.18636	1.23787	.392338	+.000
+.027628	+.100382	1.10696	1.13278	.449534	+1.583
+.084309	+.040000	1.23833	1.31019	.355937	+.000
+.038224	+.100731	1.14129	1.17747	.424608	+2.189
+.097036	+.040000	1.27466	1.36263	.331117	+.000
+.045832	+.101050	1.16593	1.21024	.406892	+2.624
+.108017	+.040000	1.30545	1.40840	.310543	+.000
+.052389	+.101372	1.18715	1.23895	.391776	+2.999
+.118151	+.040000	1.33333	1.45095	.292325	+.000
+.058413	+.101706	1.20656	1.26563	.378071	+3.343
+.127824	+.040000	1.35941	1.49178	.275661	+.000
+.064124	+.102056	1.22487	1.29117	.365269	+3.669
+.137247	+.040000	1.38427	1.53171	.260130	+.000
+.069641	+.102425	1.24243	1.31604	.353103	+3.984
+.146553	+.040000	1.40829	1.57124	.245481	+.000
+.075036	+.102815	1.25949	1.34053	.341411	+4.291
+.155835	+.040000	1.43170	1.61074	.231553	+.000
+.080358	+.103229	1.27618	1.36486	.330090	+4.594
+.165166	+.040000	1.45467	1.65049	.218236	+.000
+.085642	+.103667	1.29261	1.38916	.319066	+4.895
+.174605	+.040000	1.47732	1.69071	.205449	+.000
+.090915	+.104133	1.30888	1.41356	.308285	+5.195
+.184203	+.040000	1.49976	1.73161	.193139	+.000
+.096199	+.104627	1.32502	1.43815	.297712	+5.495
+.194011	+.040000	1.52207	1.77338	.181260	+.000

X	R	M STAR	M	P/PO	THETA
+.101512	+.105152	1.34111	1.46303	.287312	+5.796
+.204077	+.040000	1.54432	1.81619	.169779	+.000
+.106871	+.105711	1.35719	1.48827	.277062	+6.100
+.214450	+.040000	1.56656	1.86025	.158674	+.000
+.112290	+.106304	1.37329	1.51396	.266943	+6.407
+.225188	+.040000	1.58887	1.90575	.147921	+.000
+.117787	+.106937	1.38946	1.54017	.256935	+6.718
+.236345	+.040000	1.61129	1.95290	.137506	+.000
+.123376	+.107611	1.40574	1.56698	.247024	+7.033
+.297819	+.040000	1.72231	2.21114	.091906	+.000
+.151812	+.111523	1.48671	1.70769	.200256	+8.632
+.307136	+.040000	1.73737	2.24986	.086501	+.000
+.155759	+.112130	1.49768	1.72777	.194265	+8.853
+.190226	+.117271	1.54075	1.80924	.171596	+8.113
+.206648	+.119552	1.55875	1.84463	.162530	+7.697
+.222323	+.121612	1.57469	1.87666	.154713	+7.278
+.237594	+.123505	1.58915	1.90633	.147786	+6.855
+.252672	+.125260	1.60252	1.93427	.141534	+6.429
+.267706	+.126897	1.61501	1.96087	.135816	+5.999
+.282809	+.128427	1.62679	1.98640	.130537	+5.566
+.298071	+.129856	1.63798	2.01104	.125627	+5.129
+.313567	+.131187	1.64866	2.03494	.121037	+4.689
+.329372	+.132421	1.65888	2.05819	.116728	+4.245
+.345550	+.133559	1.66871	2.08087	.112669	+3.798
+.362166	+.134596	1.67815	2.10302	.108838	+3.348
+.379295	.135531	1.68725	2.12467	.105217	+2.895
+.397003	+.136356	1.69602	2.14583	.101793	+2.440
+.492034	+.138606	1.73322	2.23908	.087973	+.273
+.505944	+.138639	1.73740	2.24994	.086489	+.000

12 - C RO =0.1 RS =0.03

X	R	M STAR	M	P/PO	THETA
+.016763	+.030000	1.02956	1.03579	.506428	+.000
+.001377	+.100001	1.01652	1.01992	.516064	+.079
+.022088	+.030000	1.04587	1.05583	.494384	+.000
+.002933	+.100004	1.02405	1.02908	.510495	+.168
+.026879	+.030000	1.06050	1.07408	.483539	+.000
+.004617	+.100011	1.03127	1.03789	.505161	+.265
+.031408	+.030000	1.07442	1.09140	.473366	+.000
+.006405	+.100021	1.03832	1.04653	.499954	+.367
+.035793	+.030000	1.08768	1.10815	.463632	+.000
+.008283	+.100034	1.04528	1.05510	.494817	+.475
+.040098	+.030000	1.10055	1.12456	.454212	+.000
+.010242	+.100052	1.05220	1.06366	.489715	+.587
+.044364	+.030000	1.11316	1.14078	.445013	+.000
+.012274	+.100075	1.05912	1.07225	.484620	+.703
+.048616	+.030000	1.12556	1.15685	.436001	+.000
+.014377	+.100103	1.06605	1.08091	.479513	+.824
+.052876	+.030000	1.13783	1.17292	.427109	+.000
+.016548	+.100137	1.07304	1.08966	.474380	+.948
+.057158	+.030000	1.15003	1.18902	.418309	+.000
+.018784	+.100176	1.08008	1.09853	.469207	+1.076
+.061476	+.030000	1.16219	1.20522	.409573	+.000
+.021086	+.100222	1.08720	1.10755	.463981	+1.208
+.065842	+.030000	1.17436	1.22158	.400876	+.000
+.023453	+.100275	1.09443	1.11673	.458693	+1.343
+.070267	+.030000	1.18656	1.23815	.392193	+.000
+.025885	+.100335	1.10176	1.12611	.453329	+1.483
+.074762	+.030000	1.19884	1.25497	.383505	+.000
+.028386	+.100403	1.10923	1.13570	.447878	+1.626
+.079340	+.030000	1.21124	1.27212	.374789	+.000

X	R	M STAR	M	P/PO	THETA
+.030957	+.100479	1.11685	1.14555	.442328	+1.773
+.084013	+.030000	1.22379	1.28965	.366021	+.000
+.033603	+.100565	1.12464	1.15567	.436663	+1.925
+.109702	+.030000	1.29329	1.39017	.318616	+.000
+.048100	+.101157	1.16973	1.21535	.404176	+2.754
+.127389	+.030000	1.33975	1.46091	.288188	+.000
+.058068	+.101686	1.20064	1.25745	.382236	+3.323
+.142682	+.030000	1.37876	1.52277	.263542	+.000
+.066595	+.102217	1.22700	1.29417	.363786	+3.810
+.156906	+.030000	1.41394	1.58068	.242088	+.000
+.074419	+.102769	1.25102	1.32833	.347202	+4.256
+.170627	+.030000	1.44681	1.63677	.222753	+.000
+.081846	+.103349	1.27364	1.36114	.331804	+4.679
+.184159	+.030000	1.47815	1.69221	.204987	+.000
+.089038	+.103964	1.29535	1.39324	.317243	+5.088
+.197708	+.030000	1.50847	1.74777	.188460	+.000
+.096099	+.104617	1.31645	1.42505	.303309	+5.489
+.211422	+.030000	1.53804	1.80399	.172980	+.000
+.103091	+.105314	1.33713	1.45683	.289877	+5.886
+.225441	+.030000	1.56713	1.86140	.158394	+.000
+.110070	+.106058	1.35754	1.48882	.276844	+6.281
+.239878	+.030000	1.59591	1.92039	.144609	+.000
+.117075	+.106853	1.37779	1.52119	.264147	+6.678
+.254851	+.030000	1.62449	1.98137	.131560	+.000
+.124139	+.107705	1.39796	1.55411	.251740	+7.076
+.270487	+.030000	1.65302	2.04481	.119190	+.000
+.131295	+.108619	1.41814	1.58774	.239579	+7.480
+.286918	+.030000	1.68158	2.11114	.107467	+.000

X	R	M STAR	M	P/PO	THETA
+.138570	+.109601	1.43839	1.62221	.227639	+7.889
+.304298	+.030000	1.71027	2.18087	.096364	+.000
+.145996	+.110657	1.45877	1.65769	.215895	+8.306
+.321634	+.030000	1.73740	2.24994	.086490	+.000
+.153127	+.111724	1.47807	1.69206	.205032	+8.706
+.161386	+.112982	1.48970	1.71313	.198616	+8.615
+.204085	+.119164	1.54172	1.81113	.171101	+7.861
+.233491	+.123048	1.57158	1.87036	.156222	+7.187
+.258917	+.126111	1.59435	1.91714	.145338	+6.551
+.282550	+.128697	1.61343	1.95748	.136533	+5.941
+.305318	+.130947	1.63014	1.99372	.129059	+5.346
+.327723	+.132929	1.64516	2.02706	.122533	+4.763
+.350089	+.134679	1.65888	2.05819	.116729	+4.187
+.372627	+.136217	1.67154	2.08749	.111510	+3.620
+.395535	+.137555	1.68331	2.11525	.106778	+3.061
+.418953	+.138694	1.69428	2.14159	.102471	+2.509
+.443008	+.139634	1.70449	2.16655	.098547	+1.967
+.467824	+.140372	1.71398	2.19012	.094979	+1.438
+.493497	+.140901	1.72273	2.21219	.091755	+.925
+.520111	+.141217	1.73070	2.23258	.088873	+.434
+.545989	+.141315	1.73740	2.24994	.086489	+.000

12 - D RO =0.1 RS =0.025

X	R	M STAR	M	P/PO	THETA
+.018429	+.025000	1.03180	1.03853	.504773	+.000
+.001484	+.100001	1.01708	1.02060	.515652	+.005
+.024379	+.025000	1.04163	1.06048	.491610	+.000
+.003169	+.100005	1.02511	1.03036	.509716	+.182
+.029712	+.025000	1.06568	1.08043	.479792	+.000
+.004996	+.100012	1.03281	1.03976	.504029	+.286
+.034746	+.025000	1.08074	1.09936	.468725	+.000
+.006938	+.100024	1.04033	1.04900	.498470	+.397
+.039620	+.025000	1.09517	1.11768	.458148	+.000
+.008979	+.100040	1.04778	1.05818	.492977	+.514
+.044406	+.025000	1.10918	1.13564	.447916	+.000
+.011111	+.100062	1.05519	1.06737	.487514	+.637
+.049151	+.025000	1.12289	1.15339	.437934	+.000
+.013325	+.100089	1.06261	1.07661	.482047	+.763
+.053887	+.025000	1.13641	1.17105	.428137	+.000
+.015619	+.100122	1.07007	1.08594	.476558	+.895
+.058636	+.025000	1.14980	1.18871	.418476	+.000
+.017989	+.100162	1.07760	1.09540	.471030	+1.031
+.063418	+.025000	1.16312	1.20646	.408910	+.000
+.020435	+.100209	1.08521	1.10502	.465446	+1.171
+.068249	+.025000	1.17642	1.22437	.399402	+.000
+.022955	+.100263	1.09292	1.11482	.459793	+1.315
+.073144	+.025000	1.18976	1.24251	.389928	+.000
+.025551	+.100326	1.10077	1.12483	.454057	+1.464
+.078119	+.025000	1.20317	1.26093	.380458	+.000
+.028225	+.100398	1.10876	1.13510	.448222	+1.617
+.083188	+.025000	1.21671	1.27974	.370960	+.000
+.030980	+.100480	1.11693	1.14564	.442273	+1.774

X	R	M STAR	M	P/PO	THETA
+.088369	+.025000	1.23042	1.29899	.361409	+.000
+.033819	+.100572	1.12529	1.15651	.436194	+1.937
+.093682	+.025000	1.24436	1.31879	.351773	+.000
+.036751	+.100675	1.13389	1.16774	.429961	+2.105
+.124188	+.025000	1.32415	1.43681	.298283	+.000
+.053512	+.101432	1.18520	1.23629	.393157	+3.063
+.144912	+.025000	1.37640	1.51896	.265006	+.000
+.064800	+.102100	1.21963	1.28303	.368917	+3.708
+.162891	+.025000	1.42005	1.59095	.238444	+.000
+.074434	+.102770	1.24884	1.32519	.348699	+4.257
+.179715	+.025000	1.45934	1.65870	.215571	+.000
+.083273	+.103467	1.27541	1.36374	.330605	+4.760
+.196063	+.025000	1.49602	1.72471	.195168	+.000
+.091673	+.104202	1.30043	1.40084	.313869	+5.238
+.212317	+.025000	1.53099	1.79040	.176613	+.000
+.099822	+.104982	1.32443	1.43725	.298096	+5.701
+.228740	+.025000	1.56481	1.85673	.159534	+.000
+.107840	+.105815	1.34778	1.47344	.283047	+6.155
+.245539	+.025000	1.59785	1.92445	.143702	+.000
+.115806	+.106706	1.37068	1.50976	.268574	+6.606
+.262897	+.025000	1.63036	1.99420	.128963	+.000
+.123780	+.107661	1.39331	1.54647	.254576	+7.056
+.280994	+.025000	1.66254	2.06659	.115208	+.000
+.131813	+.108687	1.41580	1.58380	.240977	+7.509
+.300020	+.025000	1.69456	2.14228	.102360	+.000
+.139947	+.109793	1.43824	1.62196	.227724	+7.967
+.320182	+.025000	1.72655	2.22192	.090367	+.000
+.148224	+.110985	1.46073	1.66115	.214779	+8.431

X	R	M STAR	M	P/PO	THETA
+.327304	+.025000	1.73740	2.24995	.086488	+.000
+.151059	+.111409	1.46837	1.67470	.210457	+8.590
+.165248	+.113538	1.48869	1.71129	.199169	+8.472
+.174004	+.114834	1.50030	1+73261	.192046	+8.366
++182972	+.116142	1.51158	1.75360	.186799	+8.236
+.234303	+.123110	1.56685	1.86082	.158534	+7.223
+.269209	+.127276	1.59761	1.92395	.143814	+6.392
+.299455	+.130463	1.62081	1.97338	.133203	+5.637
+.327695	+.133074	1.64009	2.01573	.124714	+4.927
+.355034	+.135267	1.65682	2.05346	.117592	+4.247
+.382071	+.137119	1.67169	2.08784	.111450	+3.591
+.409193	+.138671	1.68510	2.11953	.106067	+2.956
+.436668	+.139942	1.69728	2.14888	.101308	+2.341
+.464699	+.140942	1.70834	2.17607	.097091	+1.748
+.493438	+.141678	1.71833	2.20107	.093366	+1.182
+.522994	+.142149	1.72726	2.22375	.090110	+.647
+.553399	+.142362	1.73504	2.24381	.087324	+.155
+.563876	+.142377	1.73740	2.24994	.086489	+.000

12 - E RO =0.1 RS =0.02

X	R	M STAR	M	P/PO	THETA
+.020177	+.020000	1.03426	1.04155	.502954	+.000
+.001593	+.100001	1.01763	1.02127	.515242	+.091
+.026785	+.020000	1.05374	1.06557	.488579	+.000
+.003407	+.100006	1.02616	1.03164	.508941	+.195
+.032686	+.020000	1.07121	1.08736	.475723	+.000
+.005379	+.100014	1.03434	1.04164	.502900	+.308
+.038251	+.020000	1.08757	1.10802	.463710	+.000
+.007477	+.100028	1.04234	1.05148	.496987	+.428
+.043637	+.020000	1.10325	1.12801	.452245	+.000
+.009686	+.100047	1.05027	1.06127	.491137	+.555
+.048930	+.020000	1.11845	1.14762	.441164	+.000
+.011995	+.100072	1.05818	1.07109	.485308	+.687
+.054182	+.020000	1.13334	1.16703	.430357	+.000
+.014396	+.100104	1.06612	1.08099	.479465	+.825
+.059429	+.020000	1.14802	1.18636	.419753	+.000
+.016885	+.100143	1.07411	1.09102	.473587	+.967
+.064698	+.020000	1.16258	1.20575	.409292	+.000
+.019461	+.100189	1.08220	1.10121	.467654	+1.115
+.070014	+.020000	1.17709	1.22528	.398924	+.000
+.022122	+.100245	1.09039	1.11159	.461648	+1.267
+.075395	+.020000	1.19161	1.24503	.388620	+.000
+.024869	+.100309	1.09872	1.12222	.455552	+1.425
+.080861	+.020000	1.20619	1.26511	.378332	+.000
+.027704	+.100384	1.10722	1.13311	.449348	+1.587
+.086432	+.020000	1.22091	1.28561	.368030	+.000
+.030630	+.100469	1.11590	1.14432	.443018	+1.754

X	R	M STAR	M	P/PO	THETA
+.092130	+.020000	1.23581	1.30662	.357676	+.000
+.033653	+.100566	1.12481	1.15588	.436541	+1.927
+.097981	+.020000	1.25097	1.32825	.347237	+.000
+.036780	+.100676	1.13399	1.16787	.429892	+2.106
+.104014	+.020000	1.26646	1.35066	.336663	+.000
+.040021	+.100801	1.14347	1.18034	.423040	+2.292
+.140095	+.020000	1.35771	1.48910	.276732	+.000
+.059287	+.101757	1.20169	1.25889	.381499	+3.393
+.164340	+.020000	1.41631	1.58466	.240670	+.000
+.072008	+.102593	1.23992	1.31245	.354837	+4.119
+.185476	+.020000	1.46500	1.66870	.212362	+.000
+.082839	+.103431	1.27220	1.35903	.332775	+4.736
+.205403	+.020000	1.50872	1.74824	.188327	+.000
+.092781	+.104304	1.30153	1.40249	.313142	+5.301
+.224940	+.020000	1.54948	1.82630	.167171	+.000
+.102244	+.105227	1.32911	1.44443	.295059	+5.838
+.244561	+.020000	1.58832	1.90461	.148181	+.000
+.111448	+.106210	1.35558	1.48573	.278081	+6.359
+.264608	+.020000	1.62588	1.98439	.130944	+.000
+.120527	+.107263	1.38134	1.52695	.261943	+6.873
+.285365	+.020000	1.66256	2.06665	.115199	+.000
+.129577	+.108395	1.40664	1.56848	.246479	+7.383
+.307107	+.020000	1.69867	2.15228	.100771	+.000
+.138671	+.109615	1.43166	1.61067	.231577	+7.895
+.330121	+.020000	1.73444	2.24225	.087538	+.000
+.147870	+.110933	1.45656	1.65381	.217153	+8.411
+.332096	+.020000	1.73740	2.24995	.086489	+.000
+.148637	+.111047	1.45863	1.65745	.215974	+8.454
+.166615	+.113704	1.48511	1.70479	.201134	+8.361
+.176200	+.115104	1.49791	1.72820	.194139	+8.261
+.185981	+.116513	1.51022	1.75105	.187525	+8.134

X	R	M STAR	M	P/PO	THETA
+.196010	+.117933	1.52213	1.77350	.181227	+7.981
+.206345	+.119365	1.53375	1.79570	.175187	+7.803
+.267828	+.127078	1.59201	1.91227	.146437	+6.497
+.309167	+.131423	1.62341	1.97902	.132042	+5.504
+.345077	+.134607	1.64675	2.03064	.121852	+4.631
+.378737	+.137097	1.66587	2.07429	.113833	+3.830
+.411459	+.139072	1.68219	2.11260	.107222	+3.080
+.443944	+.140620	1.69642	2.14679	.101641	+2.374
+.476616	+.141785	1.70889	2.17744	.096883	+1.710
+.509734	+.142595	1.71978	2.20473	.092833	+1.093
+.543422	+.143072	1.72913	2.22854	.089437	+.530
+.577639	+.143242	1.73685	2.24852	.086682	+.038
+.580492	+.143243	1.73740	2.24994	.086489	+.000

TABLE 13

DESIGN MACH NUMBER = 2.5

X 13 - A	R	RO =0.1 M STAR	M	P/PO	RS =0.05 THETA
+.010795	+.050000	1.02211	1.02671	.511935	+.000
+.000958	+.100000	1.01427	1.01719	.517731	+.055
+.013931	+.050000	1.03318	1.04022	.503753	+.000
+.002020	+.100002	1.01979	1.02389	.513650	+.116
+.016812	+.050000	1.04324	1.05258	.496324	+.000
+.003159	+.100005	1.02507	1.03032	.509742	+.181
+.019557	+.050000	1.05273	1.06431	.489329	+.000
+.004360	+.100010	1.03022	1.03660	.505940	+.250
+.022223	+.050000	1.06182	1.07562	.482628	+.000
+.005615	+.100016	1.03527	1.04278	.502209	+.322
+.024841	+.050000	1.07064	1.08665	.476139	+.000
+.006918	+.100024	1.04026	1.04891	.498523	+.396
+.027432	+.050000	1.07925	1.09749	.469812	+.000
+.008265	+.100034	1.04522	1.05502	.494866	+.474
+.030009	+.050000	1.08771	1.10819	.463612	+.000
+.009653	+.100047	1.05015	1.06112	.491227	+.553
+.032580	+.050000	1.09604	1.11879	.457511	+.000
+.011079	+.100061	1.05508	1.06723	.487595	+.635
+.035154	+.050000	1.10428	1.12934	.451491	+.000
+.012542	+.100079	1.06001	1.07336	.483963	+.719
+.037736	+.050000	1.11245	1.13985	.445535	+.000
+.014041	+.100099	1.06495	1.07953	.480325	+.804
+.040330	+.050000	1.12056	1.15036	.439628	+.000
+.015574	+.100121	1.06991	1.08574	.476674	+.892
+.042940	+.050000	1.12864	1.16088	.433762	+.000
+.017141	+.100147	1.07491	1.09201	.473006	+.982
+.045570	+.050000	1.13670	1.17144	.427925	+.000

X	R	M STAR	M	P/PO	THETA
+.018741	+.100176	1.07993	1.09834	.469316	+1.074
+.048223	+.050000	1.14476	1.18204	.422108	+.000
+.020374	+.100208	1.08500	1.10475	.465600	+1.167
+.050902	+.050000	1.15282	1.19272	.416304	+.000
+.022040	+.100243	1.09011	1.11124	.461854	+1.263
+.062872	+.050000	1.19061	1.24367	.389326	+.000
+.029451	+.100434	1.11557	1.14389	.443260	+1.687
+.071754	+.050000	1.21836	1.28205	.369805	+.000
+.035032	+.100614	1.13475	1.16888	.429335	+2.006
+.079453	+.050000	1.24218	1.31567	.353280	+.000
+.039896	+.100796	1.15148	1.19095	.417265	+2.285
+.086536	+.050000	1.26383	1.34683	.338455	+.000
+.044379	+.100985	1.16685	1.21148	.406234	+2.541
+.093256	+.050000	1.28411	1.37655	.324752	+.000
+.048631	+.101183	1.18138	1.23109	.395876	+2.784
+.099751	+.050000	1.30345	1.40539	.311865	+.000
+.052734	+.101390	1.19532	1.25012	.385997	+3.019
+.106108	+.050000	1.32212	1.43370	.299606	+.000
+.056736	+.101610	1.20884	1.26878	.376474	+3.247
+.112386	+.050000	1.34027	1.46172	.287851	+.000
+.060674	+.101841	1.22205	1.28722	.367229	+3.472
+.118627	+.050000	1.35805	1.48963	.276518	+.000
+.064569	+.102085	1.23504	1.30553	.358207	+3.694
+.124866	+.050000	1.37554	1.51757	.265543	+.000
+.068440	+.102342	1.24786	1.32380	.349368	+3.915
+.131129	+.050000	1.39281	1.54565	.254882	+.000
+.072301	+.102614	1.26056	1.34208	.340681	+4.135
+.137442	+.050000	1.40993	1.57396	.244498	+.000

X	R	M STAR	M	P/PO	THETA
+.076165	+.102901	1.27317	1.36045	.332121	+4.356
+.143824	+.050000	1.42692	1.60260	.234367	+.000
+.080039	+.103203	1.28572	1.37893	.323671	+4.576
+.150295	+.050000	1.44385	1.63164	.224465	+.000
+.083932	+.103522	1.29825	1.39758	.315314	+4.798
+.156874	+.050000	1.46074	1.66116	.214775	+.000
+.087854	+.103859	1.31077	1.41643	.307037	+5.021
+.163582	+.050000	1.47762	1.69125	.205283	+.000
+.091810	+.104215	1.32331	1.43552	.298829	+5.246
+.195044	+.050000	1.55323	1.83368	.165286	+.000
+.109677	+.106014	1.37979	1.52444	.262901	+6.259
+.220019	+.050000	1.60822	1.94635	.138908	+.000
+.123066	+.107573	1.42097	1.59251	.237893	+7.016
+.243132	+.050000	1.65524	2.04986	.118256	+.000
+.134813	+.109087	1.45621	1.65319	.217355	+7.678
+.265856	+.050000	1.69798	2.15061	.101036	+.000
+.145762	+.110623	1.48824	1.71048	.199414	+8.293
+.288968	+.050000	1.73812	2.25183	.086234	+.000
+.156295	+.112214	1.51830	1.76625	.183240	+8.883
+.313010	+.050000	1.77654	2.35560	.073312	+.000
+.166629	+.113883	1.54705	1.82153	.168396	+9.460
+.338459	+.050000	1.81379	2.46363	.061937	+.000
+.176907	+.115648	1.57488	1.87706	.154618	+10.032
+.347159	+.050000	1.82579	2.50015	.058514	+.000
+.180267	+.116248	1.58384	1.89536	.150312	+10.219
+.197455	+.119278	1.60474	1.93897	.140508	+9.778
+.207734	+.121024	1.61639	1.96384	.135191	+9.499
+.218077	+.122728	1.62753	1.98801	.130210	+9.209

X	R	M STAR	M	P/PO	THETA
+.228525	+.124394	1.63824	2.01161	.125516	+8.910
+.239109	+.126024	1.64857	2.03474	.121075	+8.602
+.249863	+.127620	1.65857	2.05748	.116857	+8.285
+.260818	+.129184	1.66829	2.07991	.112838	+7.960
+.272005	+.130715	1.67776	2.10209	.108996	+7.627
+.324774	+.137048	1.71715	2.19809	.093802	+6.059
+.366778	+.141061	1.74324	2.26525	.084442	+4.855
+.405552	+.143995	1.76394	2.32076	.077417	+3.799
+.443431	+.146188	1.78150	2.36954	.071732	+2.829
+.481549	+.147768	1.79682	2.41346	.066978	+1.919
+.520596	+.148783	1.81035	2.45330	.062942	+1.060
+.561056	+.149246	1.82225	2.48927	.059513	+.252
+.574649	+.149276	1.82580	2.50018	.058511	+.000

13 – B RO =0.1 RS =0.04

X	R	M STAR	M	P/PO	THETA
+.013648	+.040000	1.02558	1.03094	.509366	+.000
+.001165	+.100001	1.01540	1.01857	.516891	+.067
+.017818	+.040000	1.03914	1.04753	.499351	+.000
+.002470	+.100003	1.02193	1.02650	.512063	+.142
+.021603	+.040000	1.05142	1.06269	.490292	+.000
+.003877	+.100008	1.02819	1.03412	.507440	+.222
+.025194	+.040000	1.06298	1.07706	.481777	+.000
+.005365	+.100014	1.03429	1.04158	.502935	+.307
+.028674	+.040000	1.07407	1.09096	.473620	+.000
+.006925	+.100024	1.04029	1.04895	.498503	+.397
+.032091	+.040000	1.08483	1.10454	.465723	+.000
+.008548	+.100037	1.04624	1.05628	.494114	+.490
+.035472	+.040000	1.09535	1.11791	.458018	+.000
+.010230	+.100052	1.05216	1.06361	.489746	+.586
+.038838	+.040000	1.10569	1.13115	.450461	+.000
+.011966	+.100072	1.05808	1.07096	.485384	+.686
+.042203	+.040000	1.11590	1.14432	.443017	+.000
+.013753	+.100095	1.06401	1.07836	.481016	+.788
+.045577	+.040000	1.12603	1.15747	.435660	+.000
+.015591	+.100122	1.06997	1.08582	.476631	+.893
+.048968	+.040000	1.13609	1.17062	.428372	+.000
+.017478	+.100153	1.07597	1.09336	.472222	+1.001
+.052385	+.040000	1.14611	1.18384	.421129	+.000
+.019412	+.100188	1.08202	1.10099	.467779	+1.112
+.055833	+.040000	1.15613	1.19714	.413919	+.000
+.021394	+.100229	1.08814	1.10874	.463296	+1.226

X	R	M STAR	M	P/PO	THETA
+.059319	+.040000	1.16617	1.21055	.406726	+.000
+.023423	+.100274	1.09432	1.11661	.458766	+1.342
+.062850	+.040000	1.17623	1.22412	.399536	+.000
+.025501	+.100325	1.10059	1.12462	.454181	+1.461
+.066431	+.040000	1.18636	1.23787	.392338	+.000
+.027628	+.100382	1.10696	1.13278	.449534	+1.583
+.084309	+.040000	1.23833	1.31019	.355937	+.000
+.038224	+.100731	1.14129	1.17747	.424608	+2.189
+.097036	+.040000	1.27466	1.36263	.331117	+.000
+.045832	+.101050	1.16593	1.21024	.406892	+2.624
+.108017	+.040000	1.30545	1.40840	.310543	+.000
+.052389	+.101372	1.18715	1.23895	.391776	+2.999
+.118151	+.040000	1.33333	1.45095	.292325	+.000
+.058413	+.101706	1.20656	1.26563	.378071	+3.343
+.127824	+.040000	1.35941	1.49178	.275661	+.000
+.064124	+.102056	1.22487	1.29117	.365269	+3.669
+.137247	+.040000	1.38427	1.53171	.260130	+.000
+.069641	+.102425	1.24243	1.31604	.353103	+3.984
+.146553	+.040000	1.40829	1.57124	.245481	+.000
+.075036	+.102815	1.25949	1.34053	.341411	+4.291
+.155835	+.040000	1.43170	1.61074	.231553	+.000
+.080358	+.103229	1.27618	1.36486	.330090	+4.594
+.165166	+.040000	1.45467	1.65049	.218236	+.000
+.085642	+.103667	1.29261	1.38916	.319066	+4.895
+.174605	+.040000	1.47732	1.69071	.205449	+.000
+.090915	+.104133	1.30888	1.41356	.308285	+5.195
+.184203	+.040000	1.49976	1.73161	.193139	+.000
+.096199	+.104627	1.32502	1.43815	.297712	+5.495

X	R	M STAR	M	P/PO	THETA
+.194011	+.040000	1.52207	1.77338	.181260	+.000
+.101512	+.105152	1.34111	1.46303	.287312	+5.796
+.204077	+.040000	1.54432	1.81619	.169779	+.000
+.106871	+.105711	1.35719	1.48827	.277062	+6.100
+.214450	+.040000	1.56656	1.86025	.158674	+.000
+.112290	+.106304	1.37329	1.51396	.266943	+6.407
+.225188	+.040000	1.58887	1.90575	.147921	+.000
+.117787	+.106937	1.38946	1.54017	.256935	+6.718
+.236345	+.040000	1.61129	1.95290	.137506	+.000
+.123376	+.107611	1.40574	1.56698	.247024	+7.033
+.297819	+.040000	1.72231	2.21114	.091906	+.000
+.151812	+.111523	1.48671	1.70769	.200256	+8.632
+.349267	+.040000	1.79968	2.42178	.066113	+.000
+.172643	+.114903	1.54310	1.81383	.170396	+9.795
+.368773	+.040000	1.82578	2.50013	.058516	+.000
+.179869	+.116176	1.56213	1.85136	.160857	+10.197
+.208122	+.121116	1.59678	1.92221	.144202	+9.636
+.224484	+.123838	1.61466	1.96012	.135975	+9.260
+.240475	+.126390	1.63083	1.99523	.128756	+8.869
+.256316	+.128804	1.64572	2.02831	.122294	+8.466
+.272160	+.131104	1.65961	2.05986	.116425	+8.053
+.288126	+.133303	1.67270	2.09020	.111039	+7.630
+.304312	+.135410	1.68513	2.11960	.106055	+7.199
+.320798	+.137428	1.69700	2.14821	.101415	+6.760
+.337668	+.139361	1.70839	2.17620	.097070	+6.313
+.354996	+.141208	1.71936	2.20366	.092988	+5.858
+.372858	+.142968	1.72996	2.23067	.089138	+5.396
+.391343	+.144638	1.74022	2.25731	.085497	+4.925
+.410532	+.146211	1.75018	2.28362	.082048	+4.448
+.515143	+.152171	1.79399	2.40524	.067842	+2.074
+.599605	+.154064	1.81875	2.47862	.060508	+.494
+.630454	+.154197	1.82580	2.50018	.058511	+.000

13 - C RO =0.1 RS =0.03

X	R	M STAR	M	P/PO	THETA
+.016763	+.030000	1.02956	1.03579	.506428	+.000
+.001377	+.100001	1.01652	1.01992	.516064	+.079
+.022088	+.030000	1.04587	1.05583	.494384	+.000
+.002933	+.100004	1.02405	1.02908	.510495	+.168
+.026879	+.030000	1.06058	1.07408	.483539	+.000
+.004617	+.100011	1.03127	1.03789	.505161	+.265
+.031408	+.030000	1.07442	1.09140	.473366	+.000
+.006405	+.100021	1.03832	1.04653	.499954	+.367
+.035793	+.030000	1.08768	1.10815	.463632	+.000
+.008283	+.100034	1.04528	1.05510	.494817	+.475
+.040098	+.030000	1.10055	1.12456	.454212	+.000
+.010242	+.100052	1.05220	1.06366	.489715	+.587
+.044364	+.030000	1.11316	1.14078	.445013	+.000
+.012274	+.100075	1.05912	1.07225	.484620	+.703
+.048616	+.030000	1.12556	1.15685	.436001	+.000
+.014377	+.100103	1.06605	1.08091	.479513	+.824
+.052876	+.030000	1.13783	1.17292	.427109	+.000
+.016548	+.100137	1.07304	1.08966	.474380	+.948
+.057158	+.030000	1.15003	1.18902	.418309	+.000
+.018784	+.100176	1.08008	1.09853	.469207	+1.076
+.061476	+.030000	1.16219	1.20522	.409573	+.000
+.021086	+.100222	1.08720	1.10755	.463981	+1.208
+.065842	+.030000	1.17436	1.22158	.400876	+.000
+.023453	+.100275	1.09443	1.11673	.458693	+1.343
+.070267	+.030000	1.18656	1.23815	.392193	+.000
+.025885	+.100335	1.10176	1.12611	.453329	+1.483
+.074762	+.030000	1.19884	1.25497	.383505	+.000

X	R	M STAR	M	P/PO	THETA
+.028386	+.100403	1.10923	1.13570	.447878	+1.626
+.079340	+.030000	1.21124	1.27212	.374789	+.000
+.030957	+.100479	1.11685	1.14555	.442328	+1.773
+.084013	+.030000	1.22379	1.28965	.366021	+.000
+.033603	+.100565	1.12464	1.15567	.436663	+1.925
+.109702	+.030000	1.29329	1.39017	.318616	+.000
+.048100	+.101157	1.16973	1.21535	.404176	+2.754
+.127389	+.030000	1.33975	1.46091	.288188	+.000
+.058068	+.101686	1.20064	1.25745	.382236	+3.323
+.142682	+.030000	1.37876	1.52277	.263542	+.000
+.066595	+.102217	1.22700	1.29417	.363786	+3.810
+.156906	+.030000	1.41394	1.58068	.242088	+.000
+.074419	+.102769	1.25102	1.32833	.347202	+4.256
+.170627	+.030000	1.44681	1.63677	.222753	+.000
+.081846	+.103349	1.27364	1.36114	.331804	+4.679
+.184159	+.030000	1.47815	1.69221	.204987	+.000
+.089038	+.103964	1.29535	1.39324	.317243	+5.088
+.197708	+.030000	1.50847	1.74777	.188460	+.000
+.096099	+.104617	1.31645	1.42505	.303309	+5.489
+.211422	+.030000	1.53804	1.80399	.172980	+.000
+.103091	+.105314	1.33713	1.45683	.289877	+5.886
+.225441	+.030000	1.56713	1.86140	.158394	+.000
+.110070	+.106058	1.35754	1.48882	.276844	+6.281
+.239878	+.030000	1.59591	1.92039	.144609	+.000
+.117075	+.106853	1.37779	1.52119	.264147	+6.678
+.254851	+.030000	1.62449	1.98137	.131560	+.000
+.124139	+.107705	1.39796	1.55411	.251740	+7.076
+.270487	+.030000	1.65302	2.04481	.119190	+.000
+.131295	+.108619	1.41814	1.58774	.239579	+7.480
+.286918	+.030000	1.68158	2.11114	.107467	+.000

X	R	M STAR	M	P/PO	THETA
+.138570	+.109601	1.43839	1.62221	.227639	+7.889
+.304298	+.030000	1.71027	2.18087	.096364	+.000
+.145996	+.110657	1.45877	1.65769	.215895	+8.306
+.322813	+.030000	1.73919	2.25461	.085859	+.000
+.153603	+.111797	1.47935	1.69436	.204323	+8.733
+.342685	+.030000	1.76843	2.33309	.075939	+.000
+.161428	+.113030	1.50019	1.73241	.192905	+9.170
+.385289	+.030000	1.82575	2.50003	.058525	+.000
+.176977	+.115660	1.54121	1.81014	.171362	+10.036
+.235993	+.125604	1.61140	1.95313	.137457	+9.092
+.262628	+.129728	1.63696	2.00877	.126072	+8.509
+.287509	+.133321	1.65829	2.05684	.116975	+7.928
+.311593	+.136551	1.67695	2.10019	.109321	+7.347
+.335401	+.139498	1.69374	2.14030	.102677	+6.767
+.359278	+.142208	1.70913	2.17804	.096791	+6.185
+.383456	+.144704	1.72340	2.21391	.091508	+5.603
+.408156	+.147001	1.73676	2.24828	.086714	+5.020
+.433549	+.149101	1.74934	2.28138	.082337	+4.436
+.459794	+.151002	1.76122	2.31334	.078321	+3.851
+.487066	+.152698	1.77246	2.34423	.074627	+3.267
+.515519	+.154178	1.78309	2.37405	.071228	+2.686
+.545323	+.155426	1.79313	2.40274	.068107	+2.109
+.576657	+.156425	1.80254	2.43016	.065254	+1.542
+.609702	+.157154	1.81128	2.45609	.062669	+.988
+.678011	+.157743	1.82580	2.50018	.058511	+.000

13 - D RO =0.1 RS =0.025

X	R	M STAR	M	P/PO	THETA
+.018429	+.025000	1.03180	1.03853	.504773	+.000
+.001484	+.100001	1.01708	1.02060	.515652	+.085
+.024379	+.025000	1.04963	1.06048	.491610	+.000
+.003169	+.100005	1.02511	1.03036	.509716	+.182
+.029712	+.025000	1.06568	1.08043	.479792	+.000
+.004996	+.100012	1.03281	1.03976	.504029	+.286
+.034746	+.025000	1.08074	1.09936	.468725	+.000
+.006938	+.100024	1.04033	1.04900	.498470	+.397
+.039620	+.025000	1.09517	1.11768	.458148	+.000
+.008979	+.100040	1.04778	1.05818	.492977	+.514
+.044406	+.025000	1.10918	1.13564	.447916	+.000
+.011111	+.100062	1.05519	1.06737	.487514	+.637
+.049151	+.025000	1.12289	1.15339	.437934	+.000
+.013325	+.100089	1.06261	1.07661	.482047	+.763
+.053887	+.025000	1.13641	1.17105	.428137	+.000
+.015619	+.100122	1.07007	1.08594	.476558	+.895
+.058636	+.025000	1.14980	1.18871	.418476	+.000
+.017989	+.100162	1.07760	1.09540	.471030	+1.031
+.063418	+.025000	1.16312	1.20646	.408910	+.000
+.020435	+.100209	1.08521	1.10502	.465446	+1.171
+.068249	+.025000	1.17642	1.22437	.399402	+.000
+.022955	+.100263	1.09292	1.11482	.459793	+1.315
+.073144	+.025000	1.18976	1.24251	.389928	+.000
+.025551	+.100326	1.10077	1.12483	.454057	+1.464
+.078119	+.025000	1.20317	1.26093	.380458	+.000
+.028225	+.100398	1.10876	1.13510	.448222	+1.617
+.083188	+.025000	1.21671	1.27974	.370960	+.000
+.030980	+.100480	1.11693	1.14564	.442273	+1.774

X	R	M STAR	M	P/PO	THETA
+.088369	+.025000	1.23042	1.29899	.361409	+.000
+.033819	+.100572	1.12529	1.15651	.436194	+1.937
+.093682	+.025000	1.24436	1.31879	.351773	+.000
+.036751	+.100675	1.13389	1.16774	.429961	+2.105
+.124188	+.025000	1.32415	1.43681	.298283	+.000
+.053512	+.101432	1.18520	1.23629	.393157	+3.063
+.144912	+.025000	1.37640	1.51896	.265006	+.000
+.064800	+.102100	1.21963	1.28383	.368917	+3.708
+.162891	+.025000	1.42005	1.59095	.238444	+.000
+.074434	+.102770	1.24884	1.32519	.348699	+4.257
+.179715	+.025000	1+05134	1+61070	L+200000000	
+.083273	+.103467	1.07541	1.36374	.330605	+4.760
+.196063	+.025000	1.49602	1.72471	.195160 7	+.000
+.091673	+.104202	1.30043	1.40084	.313869	+5.238
+.212317	+.025000	1.53099	1.79040	.176613	+.000
+.099822	+.104982	1.32443	1.43725	.298096	+5.701
+.228740	+.025000	1.56481	1.85673	.159534	+.000
+.107840	+.105815	1.34778	1.47344	.283047	+6.155
+.245539	+.025000	1.59785	1.92445	.143702	+.000
+.115806	+.106706	1.37068	1.50976	.268574	+6.606
+.262897	+.025000	1.63036	1.99420	.128963	+.000
+.123780	+.107661	1.39331	1.54647	.254576	+7.056
+.280994	+.025000	1.66254	2.06659	.115208	+.000
+.131813	+.108687	1.41580	1.58380	.240977	+7.509
+.300020	+.025000	1.69456	2.14228	.102360	+.000
+.139947	+.109793	1.43824	1.62196	.227724	+7.967
+.320182	+.025000	1.72655	2.22192	.090367	+.000
+.148224	+.110985	1.46073	1.66115	.214779	+8.431

X	R	M STAR	M	P/PO	THETA
+.341728	+.025000	1.75863	2.30632	.079186	+.000
+.156683	+.112275	1.48335	1.70160	.202105	+8.905
+.364957	+.025000	1.79092	2.39638	.068787	+.000
+.165369	+.113674	1.50619	1.74354	.189676	+9.390
+.390234	+.025000	1.82354	2.49323	.059147	+.000
+.174329	+.115195	1.52934	1.78723	.177469	+9.889
+.392034	+.025000	1.82575	2.50004	.058524	+.000
+.174956	+.115305	1.53094	1.79031	.176636	+9.924
+.236802	+.125659	1.60617	1.94201	.139847	+9.086
+.273367	+.131259	1.64078	2.01726	.124417	+8.328
+.305261	+.135723	1.66680	2.07644	.113452	+7.605
+.335215	+.139536	1.68837	2.12734	.104779	+6.904
+.364380	+.142890	1.70716	2.17316	.097534	+6.218
+.393392	+.145878	1.72398	2.21538	.091298	+5.543
+.422676	+.148548	1.73929	2.25488	.085823	+4.876
+.452547	+.150923	1.75338	2.29219	.080956	+4.217
+.483261	+.153013	1.76643	2.32759	.076595	+3.567
+.515049	+.154816	1.77854	2.36122	.072671	+2.925
+.548123	+.156324	1.78978	2.39310	.069140	+2.296
+.582671	+.157524	1.80014	2.42312	.065976	+1.684
+.618869	+.158402	1.80959	2.45103	.063165	+1.095
+.656850	+.158944	1.81804	2.47646	.060712	+.540
+.696646	+.159144	1.82535	2.49881	.058637	+.034
+.699424	+.159144	1.82580	2.50018	.058511	+.000

: W - E RO =0.1 RS =0.02

X	R	M STAR	M	P/PO	THETA
+.020177	+.020000	1.03426	1.04155	.502954	+.000
+.001593	+.100001	1.01763	1.02127	.515242	+.091
+.026785	+.020000	1.05374	1.06557	.488579	+.000
+.003407	+.100006	1.02616	1.03164	.508941	+.195
+.032686	+.020000	1.07121	1.08736	.475723	+.000
+.005379	+.100014	1.03434	1.04164	.502900	+.308
+.038251	+.020000	1.08757	1.10802	.463710	+.000
+.007477	+.100028	1.04234	1.05148	.496987	+.428
+.043637	+.020000	1.10325	1.12801	.452245	+.000
+.009686	+.100047	1.05027	1.06127	.491137	+.555
+.048930	+.020000	1.11845	1.14762	.441164	+.000
+.011995	+.100072	1.05818	1.07109	.485308	+.687
+.054182	+.020000	1.13334	1.16703	.430357	+.000
+.014396	+.100104	1.06612	1.08099	.479465	+.825
+.059429	+.020000	1.14802	1.18636	.419753	+.000
+.016885	+.100143	1.07411	1.09102	.473587	+.967
+.064698	+.020000	1.16258	1.20575	.409292	+.000
+.019461	+.100189	1.08220	1.10121	.467654	+1.115
+.070014	+.020000	1.17709	1.22528	.398924	+.000
+.022122	+.100245	1.09039	1.11159	.461648	+1.267
+.075395	+.020000	1.19161	1.24503	.388620	+.000
+.024869	+.100309	1.09872	1.12222	.455552	+1.425
+.080861	+.020000	1.20619	1.26511	.378332	+.000
+.027704	+.100384	1.10722	1.13311	.449348	+1.587
+.086432	+.020000	1.22091	1.28561	.368030	+.000
+.030630	+.100469	1.11590	1.14432	.443018	+1.754
+.092130	+.020000	1.23581	1.30662	.357676	+.000

X	R	M STAR	M	P/PO	THETA
+.033653	+.100566	1.12481	1.15588	.436541	+1.927
+.097981	+.020000	1.25097	1.32825	.347237	+.000
+.036780	+.100676	1.13399	1.16787	.429892	+2.106
+.104014	+.020000	1.26646	1.35066	.336663	+.000
+.040021	+.100801	1.14347	1.18034	.423040	+2.292
+.140095	+.020000	1.35771	1.48910	.276732	+.000
+.059287	+.101757	1.20169	1.25889	.381499	+3.393
+.164340	+.020000	1.41631	1.58466	.240670	+.000
+.072008	+.102593	1.23992	1.31245	.354837	+4.119
+.185476	+.020000	1.46500	1.66870	.212362	+.000
+.082839	+.103431	1.27220	1.35903	.332775	+4.736
+.205403	+.020000	1.50872	1.74824	.188327	+.000
+.092781	+.104304	1.30153	1.40249	.313142	+5.301
+.224940	+.020000	1.54948	1.82630	.167171	+.000
+.102244	+.105227	1.32911	1.44443	.295059	+5.838
+.244561	+.020000	1.58832	1.90461	.148181	+.000
+.111448	+.106210	1.35558	1.48573	.278081	+6.359
+.264608	+.020000	1.62588	1.98439	.130944	+.000
+.120527	+.107263	1.38134	1.52695	.261943	+6.873
+.285365	+.020000	1.66256	2.06665	.115199	+.000
+.129577	+.108395	1.40664	1.56848	.246479	+7.383
+.307107	+.020000	1.69867	2.15228	.100771	+.000
+.138671	+.109615	1.43166	1.61067	.231577	+7.895
+.330121	+.020000	1.73444	2.24225	.087538	+.000
+.147870	+.110933	1.45656	1.65381	.217153	+8.411
+.354723	+.020000	1.77003	2.33750	.075416	+.000
+.157228	+.112360	1.48146	1.69817	.203154	+8.935
+.381297	+.020000	1.80562	2.43924	.064337	+.000
+.166803	+.113912	1.50647	1.74404	.189531	+9.470
+.397380	+.020000	1.82582	2.50024	.058506	+.000

X	R	M STAR	M	P/PO	THETA
+.172332	+.114849	1.52071	1.77079	.181975	+9.778
+.186723	+.117322	1.54161	1.81091	.171158	+9.722
+.197086	+.119089	1.55542	1.83802	.164190	+9.635
+.207791	+.120895	1.56878	1.86472	.157585	+9.515
+.271940	+.131005	1.63479	2.00397	.127017	+8.397
+.315537	+.137072	1.67003	2.08395	.112129	+7.448
+.353706	+.141767	1.69626	2.14642	.101700	+6.580
+.389748	+.145663	1.71784	2.19983	.093546	+5.759
+.425052	+.148980	1.73649	2.24757	.086811	+4.973
+.460393	+.151819	1.75300	2.29116	.081086	+4.214
+.496281	+.154231	1.76783	2.33144	.076134	+3.477
+.533092	+.156239	1.78124	2.36882	.071813	+2.765
+.571120	+.157847	1.79336	2.40341	.068036	+2.080
+.610597	+.159056	1.80422	2.43513	.064750	+1.428
+.651642	+.159862	1.81379	2.46362	.061938	+.821
+.694248	+.160269	1.82192	2.48828	.059605	+.274
+.718939	+.160328	1.82580	2.50018	.058511	+.000

Errata on Page 95

The 11th and 12th rows should be:

X	R	M STAR	M	P/PO	THETA
+.179715	+.025000	1.45934	1.65870	.215571	+.000
+.083273	+.103467	1.27541	1.36374	.330605	+4.760